



Agricultural Finance Yearbook 2009

Investment-led productivity building in agricultural value chains

Bank of Uganda and Plan for the Modernization of Agriculture



Financial System Development
Programme



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Foreword

At this time, when so much attention is being given to the National Development Plan, the Yearbook on Agricultural Finance for 2009, like Yearbooks for 2007 and 2008 seeks to reflect the main issues, actions, successes and failures experienced in Uganda during the year, in the overall area of financial sector support to agriculture. It is increasingly recognized that adequate access to financial services is vital for those who build productivity and earn their livelihoods in agricultural commodity value chains.

It has not been an outstanding year for agriculture or for agricultural finance, and this is reflected in the pages that follow.

The Yearbook can be introduced by looking at a sample of the challenges involved.

Challenge One: There has been an apparent reduction in the level of advances from formal (i.e. regulated) lenders to the agricultural sector. This means that the trend first identified in the 2008 Yearbook, unfortunately, has continued as described in Article 1.1.

Challenge Two: Despite a good second season, drought was a problem in most areas in the country in the first growing season, depressing production and affecting the willingness of farmers and their financiers to invest in agriculture. However, in many parts of Uganda the risk of rainfall failure can be addressed by investment in irrigation. This is not just a matter of pouring on water. The precision application of water to the root zones of crop plants means a selective growth boost is provided, a boost that can significantly reduce the enormous task of ensuring that crops are adequately weeded.

Article 2.3 introduces irrigation as a highly promising area for investment, but promising as it is, the technique is not much practised in Uganda, outside of large commercial farms and estates. The scope for investment in water access, storage and application is huge.

Challenge Three: Some of the worthwhile initiatives to improve farm production through investment, as covered in previous Yearbooks, have not realized their potential. A good example is the expected expansion of animal traction loans in the north and east of the country, an expansion which in the event was much less than expected, given the very satisfactory start that was made with this loan product. Whereas the ban on the movement of stock in some parts, occasioned by a Foot and Mouth Disease alert, undoubtedly reduced the loan programme, there is some evidence that lenders have been slow to move into term lending for small holders. See Article 2.1 for a more complete treatment of this topic.

Challenge Four: The Government's reliance on SACCOs as important providers of financial services to smallholder farming members of these cooperatives, has taken a knock in some informed quarters. This is hardly surprising. In district after district many if not most of the SACCOs resulting from the mobilization efforts of some local politicians have been shown to be false, in the sense that they exist in name, but not in fact. That is, they are by no means the providers of financial services that they purport to be.

To demonstrate that SACCOs can be soundly established and moreover can lend profitably for agricultural investments three articles have been included in this Yearbook, describing the managerial approaches used to ensure the soundness of farming loans. One of these (Article 5.1 on Kyamuhunga SACCO) is a follow up to an article in the 2008 Yearbook. The others, on Rukooma SACCO (Article 5.2) and Agaru SACCO (Article 5.3) show that Kyamuhunga is not an isolated success story. Lessons for other SACCOs are clearly set out in these two articles, while policy makers too could well profit from a study of what is involved in successful, local financial intermediation.

The Yearbook series, including this edition, is commended to all concerned to see improved linkages between the financial and agricultural sectors in Uganda.

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Chapter One

Policy

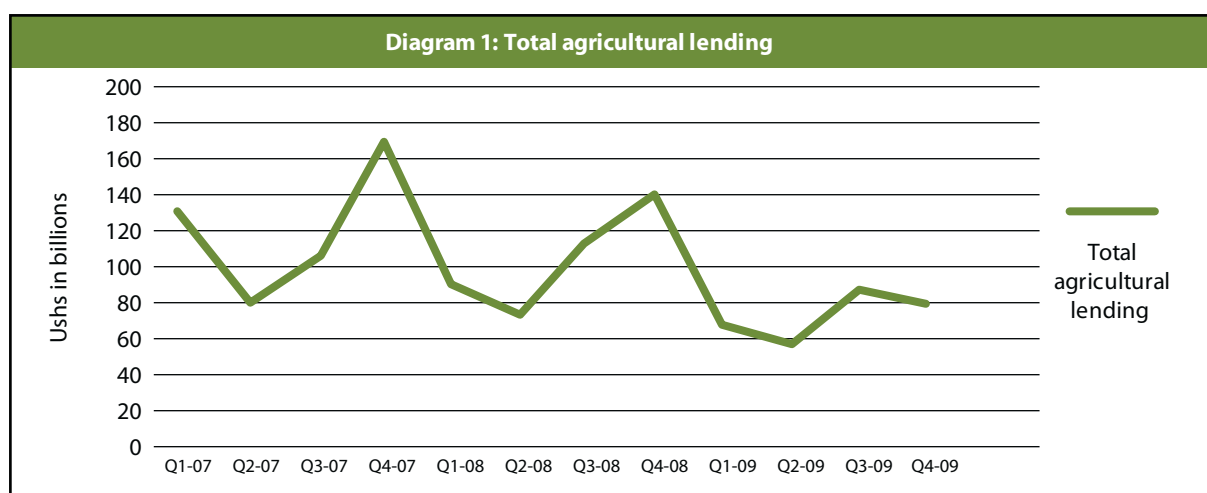
1.1 Trends in Agricultural Finance in 2009 ¹



Background

The following article summarizes data collected on “**new**” agricultural advances extended by commercial banks, credit institutions and MDI’s during the year 2009. The data presented below tries to track the activity or flows rather than the outstanding portfolio for loans advanced to the

agricultural sector, in order to enhance policy formulation and delivery at the macro level. Because of this approach, the results compiled by these two methods are bound to be different and should not be confused.



¹ Author: Irene Sekamwa GTZ/FSD Programme

Diagram 1 above illustrates the times series of data captured between 2007 and 2009. During the period agricultural lending by commercial banks, credit institutions and MDIs, continued to decline in 2009 but the decline was much greater than in 2008.

The information on advances by financial institutions and MDIs to the Agricultural Sector was first compiled for publication in the 2007 Agricultural Finance Yearbook and subsequently in the 2008 edition. The format for compilation and presentation during this period has not changed. The 2009 edition continues this theme, though during this year information on financial instruments like leases to the agricultural sector have also been captured.

Despite this qualification, the total lending figures for 2007, 2008 and 2009 as noted above, and as set out in Table 1 below, show clearly a significant reduction in advances by regulated institutions from 2008 to 2009.

It is important to note that the figures in Table 1 for 2009 relate to loans and for the first time include the value of leases for agricultural machinery.

The availability of agricultural finance for small and medium scale enterprises has generally remained limited despite Uganda's growing banking industry. Although minor as a lending category for most financial institutions, there is now a renewed interest in the area by the public and private sectors, as well by development partners. This interest is prompted by a clear recognition of the importance of investment in agriculture to raise the productivity of rural Ugandans.

Indeed, the need for substantial increases in credit-financed investment along agricultural value chains is now well accepted. Moreover, the growing competition within the financial sector is spurring innovation and the development of new loan products for this as for other sectors of the economy.

Table 1: Total Agricultural Lending by Regulated FIs and MDIs between 2007 and 2009 in billions of shillings

	Quarters				Annual Totals
	1st	2nd	3rd	4th	
2007	86	84	108	172	450
2008	92	73	118	142	425
2009	69	57	86	79	291

Regulated financial institutions in Uganda by category

Commercial banks still constitute the biggest percentage of the total number of regulated financial institutions in Uganda. The numbers within the three tiers are set out in Table 2 below.

Table 2. Regulated Financial Institutions and Micro Deposit Taking Institutions

Year	Tier 1	Tier 2	Tier 3	Total
2007	14	5	4	23
2008	20	5	4	29
2009	21	4	3	28

Note:
Tier 1: Commercial Banks
Tier 2: Credit Institutions
Tier 3: Micro Deposit Taking Institutions

The difference in number of regulated financial institutions between 2008 and 2009 can be attributed to different financial institutions attaining different regulatory banking licenses. In 2009 Housing Finance which was a Tier 2 institution obtained a Tier 1 license. During the same period Opportunity International took over Faulu Uganda (a former Tier 4 institution) and applied for a Tier 2 license which it eventually obtained during the same period. These changes will be reflected in the subsequent data (collected/published) on advances to agriculture.

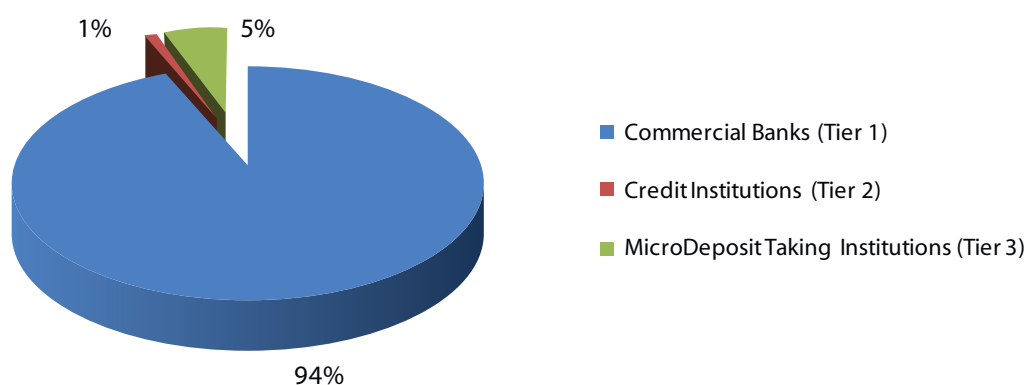


Agricultural lending by category of financial institution

Commercial banks still remain the biggest contributors to agricultural lending, contributing 94% of the total amount lent out for agriculture in 2009 (as in 2008). However, the trend has been reversed from the past two years whereby Credit

Institutions and MDIs were the second and third contributors respectively². MDI's now contribute 5% of the total amount of agricultural lending as compared to Credit Institutions that contribute only 1%³.

Diagram 2: Percentage Contribution to Agricultural Lending in 2009



Source: Bank of Uganda Supervision Department

² 2008 Agricultural Finance Year Book - As in 2007, they are followed by MDIs and Credit Institutions whose contribution has increased and decreased respectively by 3.4% and 0.1% respectively.

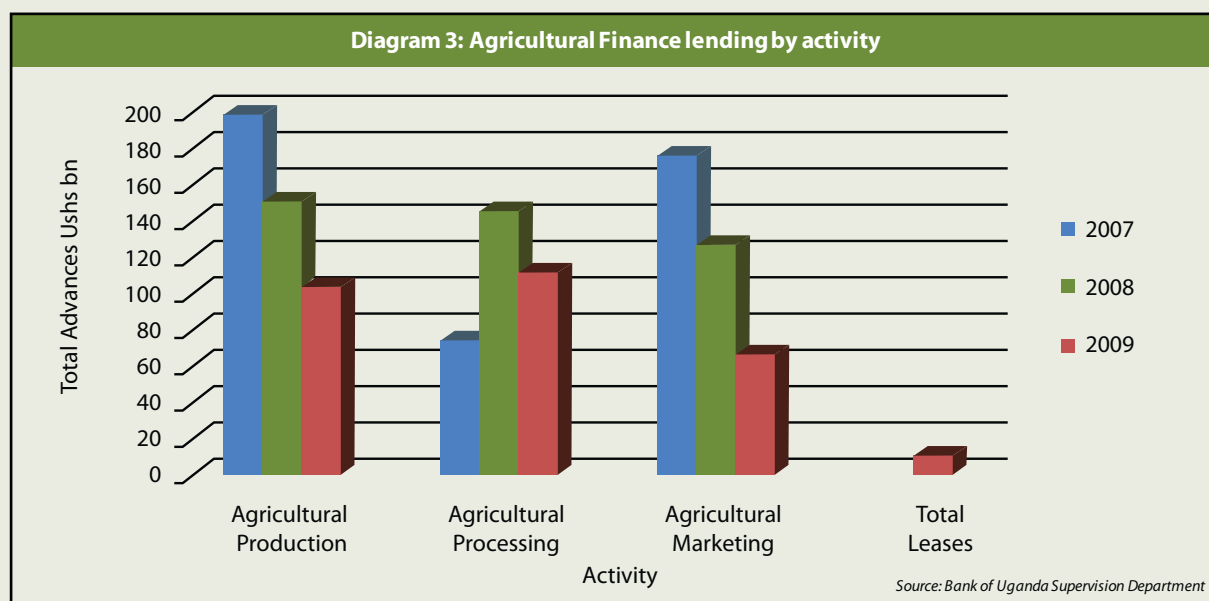
³ As earlier mentioned, this data includes the value of new leases written by the financial institutions during the period across the whole value chain.

Lending to agricultural value chains

Diagram 3 indicates that in 2009 lending across the whole value chain (production, processing and marketing) has significantly declined despite the inclusion of new leases. However, there was a marginal reverse in the trend i.e. lending by regulated financial institutions for agricultural processing relative to agricultural production. Lending for agricultural production has grown marginally relative to lending to agricultural processing.

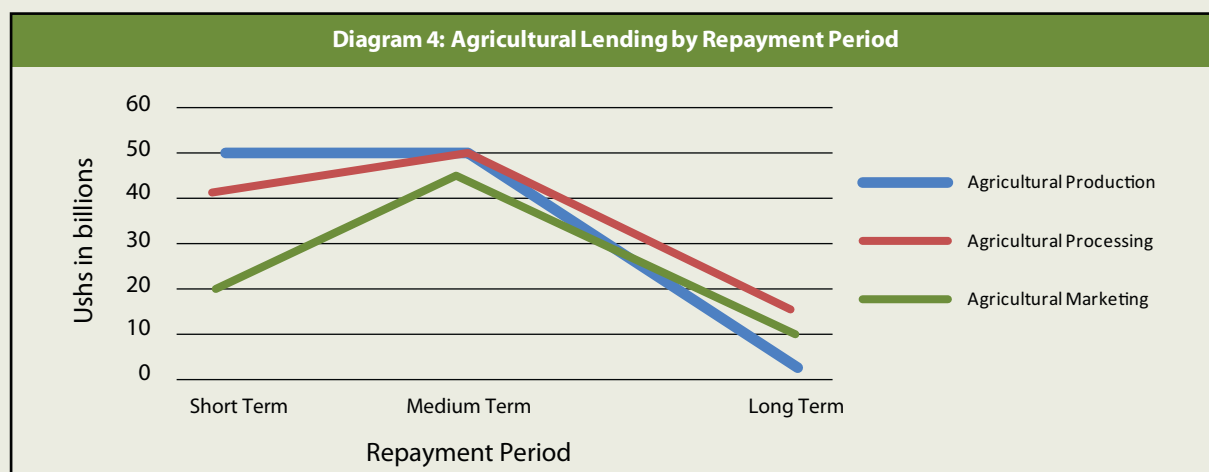
In terms of percentages of the contributions of each stage of the value chain, lending to agricultural processing increased by 4% from 34% in 2008 to 38% in 2009 while lending to agricultural production increased by 1% from 36% in 2008 to 37% in 2009.

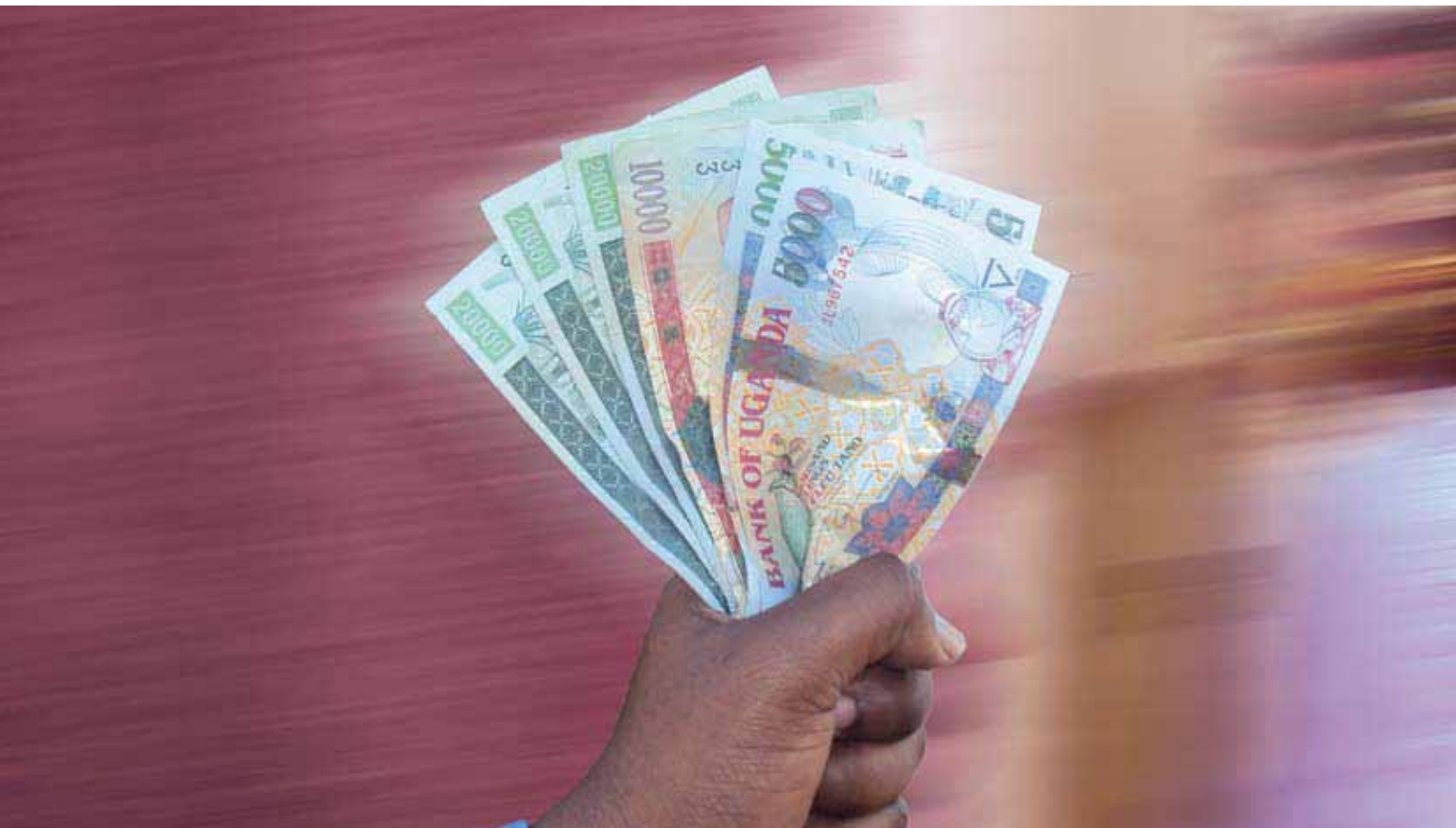
Lending to agricultural marketing continued to contribute the least in 2009, as in 2008 with its contribution declining by 7% from 30% in 2008 to 23% in 2009.



Agricultural Finance Lending by Repayment Period

Diagram 4 illustrates that most of the lending was medium term (1 – 3 years); contributing 49 percent of the total lent to the sector in 2009. This was followed by short term lending (<1 year) which contributed 40 percent and long term lending (3+ years) which contributed 11 percent of the total lent out to agriculture in 2009.

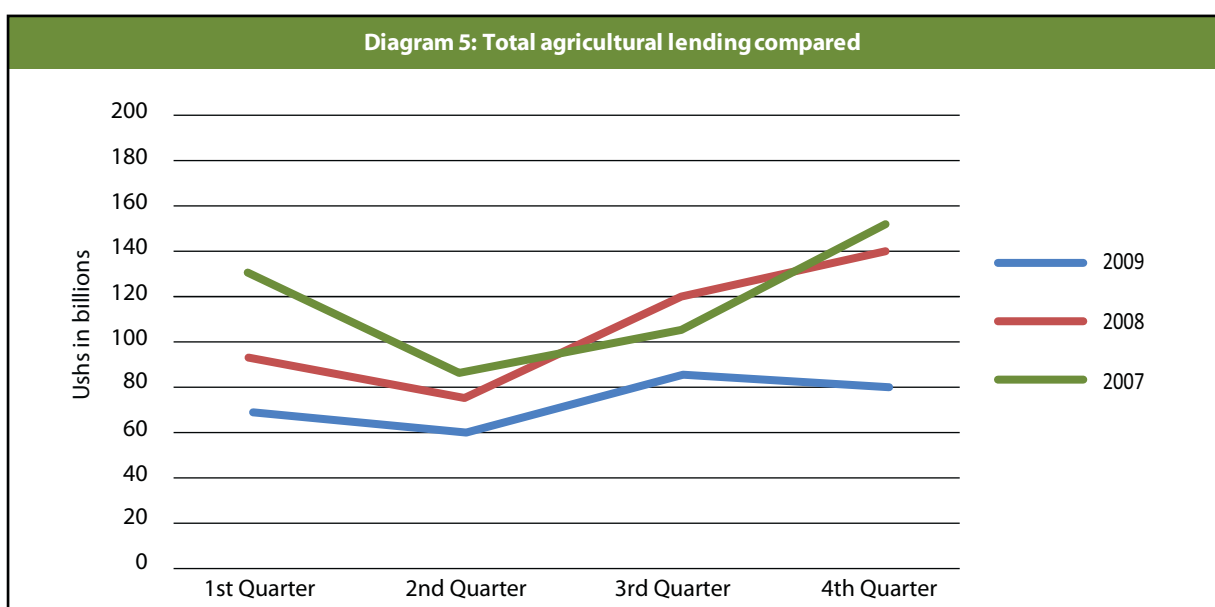




However, this illustration may not reflect a true picture of agricultural lending. This is because some of the financial institutions providing data still have MIS systems that are incapable of classifying these activities.

Total Agricultural Lending

From Diagram 5, we see that total agricultural lending in 2009 reduced by 32% from 2008.



This is attributable to a number of reasons:

- As stated in the 2008 edition of the Yearbook, there was a notable increase in the number of licensed commercial banks during 2008 and a subsequently slight increase in 2009. However by the time the data were compiled, not all of these new financial institutions had started substantive operations, and therefore had not yet started lending.
- Risk management by some lenders engaged in lending to this sector led to decisions within banks to reduce exposure. Two factors were notable here:
 - Climate conditions, including a prolonged drought between 2008 and 2009 in many parts of the country, resulted in a slowdown in lending especially at the production level of the chain, to mitigate the risk faced by some lenders.
 - Animal diseases, especially foot and mouth disease resulted in a cattle quarantine in some areas of the country.
- Agricultural lending may have been impacted by growth in other more profitable sectors of the economy e.g. services, construction and even consumer credit!
- Bank lending for agriculture is only a part of the story of tracking agricultural investment flows. Many agro-based industries access credit from their overseas head offices or from cheaper capital markets abroad, as mentioned in the 2007 edition of the Year Book.

Conclusion

From the 2009 statistics, agricultural lending as a percentage of the total lent out from all the regulated Financial Institutions and MDIs (Tiers 1, 2 and 3) declined by 2.9% from 11.9% in 2008 to 9% in 2009. Yet this coincides with a period when Financial Institutions and MDIs have grown their overall loan portfolios. Therefore the statement in the 2008 edition of the Year Book still holds⁴ but it should also be noted that subsequent policy actions for the sector during the intervening periods (2008 and 2009) may only be realized in the medium to long term, so some movement could be expected to start during 2010.

However, as in the 2008 Yearbook, a **caveat** is in order. There is still reason to believe that there is significant scope for improvement in the quality of the data being collected in this area – as explained above and also mentioned at the beginning of the article. It is hoped that as this situation improves, the future will see more reliable time series and comparative analyses, for publication in subsequent editions of the Yearbook.

⁴ This suggests that agricultural finance still contributes a relatively small percentage to the total loan portfolios of these institutions, highlighting the scope for additional policy actions to revamp the performance of the agricultural finance sector.

1.2 Agricultural Zoning and its Effects on Investments ¹



Introduction

The delineation and characterisation of agricultural zones in Uganda have been evolving over time depending on several factors used, including the number of variables. The 2008 Agricultural Finance Yearbook briefly described the most recent agricultural production zoning that Government launched in 2004. It also discussed the implications of agricultural zoning for agricultural financing. In this Yearbook we focus on the effects that zoning has on public and private investments. The examples used include those before and after the 2004 zoning plan.

Policy on public and private investments in agriculture

Key elements of the agriculture policy have been reiterated in various policy documents, including the Plan for Modernisation of Agriculture, Development Strategy and Investment Plan (DSIP) of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the National Development Plan and the draft National Agriculture Policy.

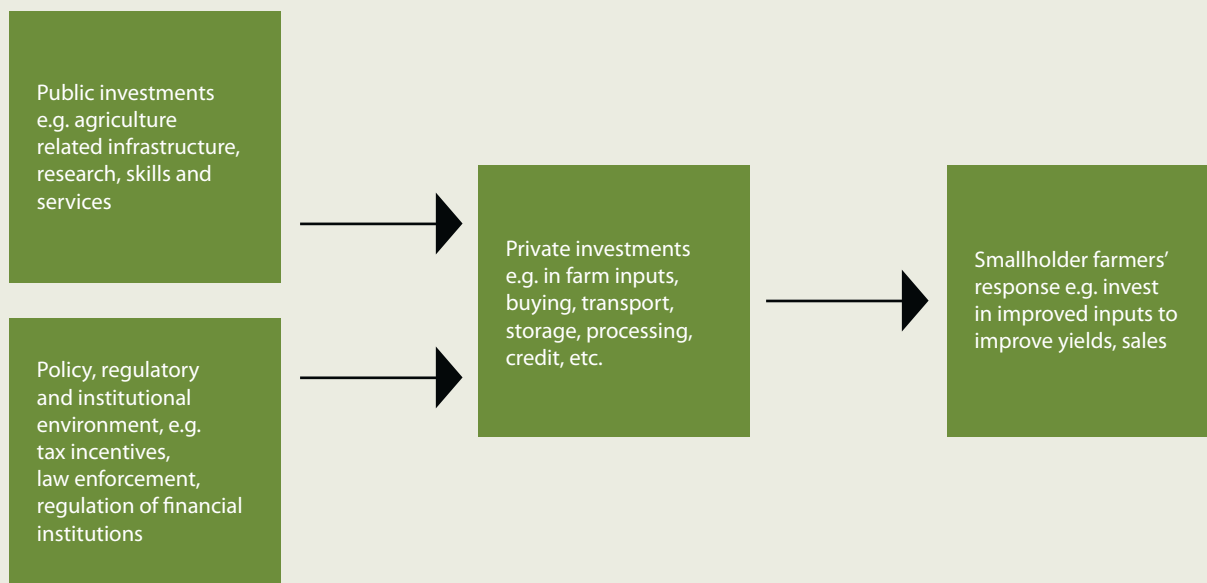
They include:

- In line with the government policy of a private sector led and market-oriented economy, public actions in agriculture (policy, regulatory and institutional reforms as well as public investments in public goods and services) should not crowd out but rather support or complement private investments in agriculture.
- For reasons of comparative advantage, viable agro-industrial development and equity, future agricultural development shall be pursued according to the 2004 zoning strategy and commodity value chain development shall be supported in different zones.

Thus public actions (combination of reforms and public investments and zonal targeting) are an incentive for stimulating private investments which in turn trigger farmers' investment that lead to higher farm production and productivity. This simplified pathway of responses is sketched in Figure 1.

¹ Author: Tom Kakuba, PMA Secretariat, MAAIF

Figure 1: Synergies between public good investments, institutional reforms and private and smallholder farm level investments



Over the last two decades, Government has implemented many policy and regulatory reforms together with other public sector actors (bilateral and multilateral donors, NGOs and local governments), and implemented national and zonal based programmes that have improved the environment for the growth in the number and diversity of tangible private investments in agriculture and agribusinesses in different parts of the country.

A few examples of these investments and their effects are discussed in this article. The examples include: enterprise selection, agricultural inputs, output marketing and value addition. It should be noted that there are many other public and private investments within and outside agriculture that strongly affect the above investment areas. They include energy, roads, agricultural finance and training. This article recognises their importance but does not go further than this.

Enterprise selection and technology transfer

Through various programmes Government continues to target public investment in those commodities that have a high impact on household and national food security, and on income generation.

Between 2001 and 2006, government implemented a Strategic Exports Programme (SEP) to stimulate private investments along value chains for selected export commodities. The agricultural commodities were: coffee, cotton, tea, cocoa, Irish potatoes, livestock, fish and horticulture. Government actions included: policy, legal and institutional reforms, supporting and promoting Public-Private Partnerships, provision of key inputs like improved breeds and planting materials, accelerating skills development and provision of appropriate resources for working capital and investments.

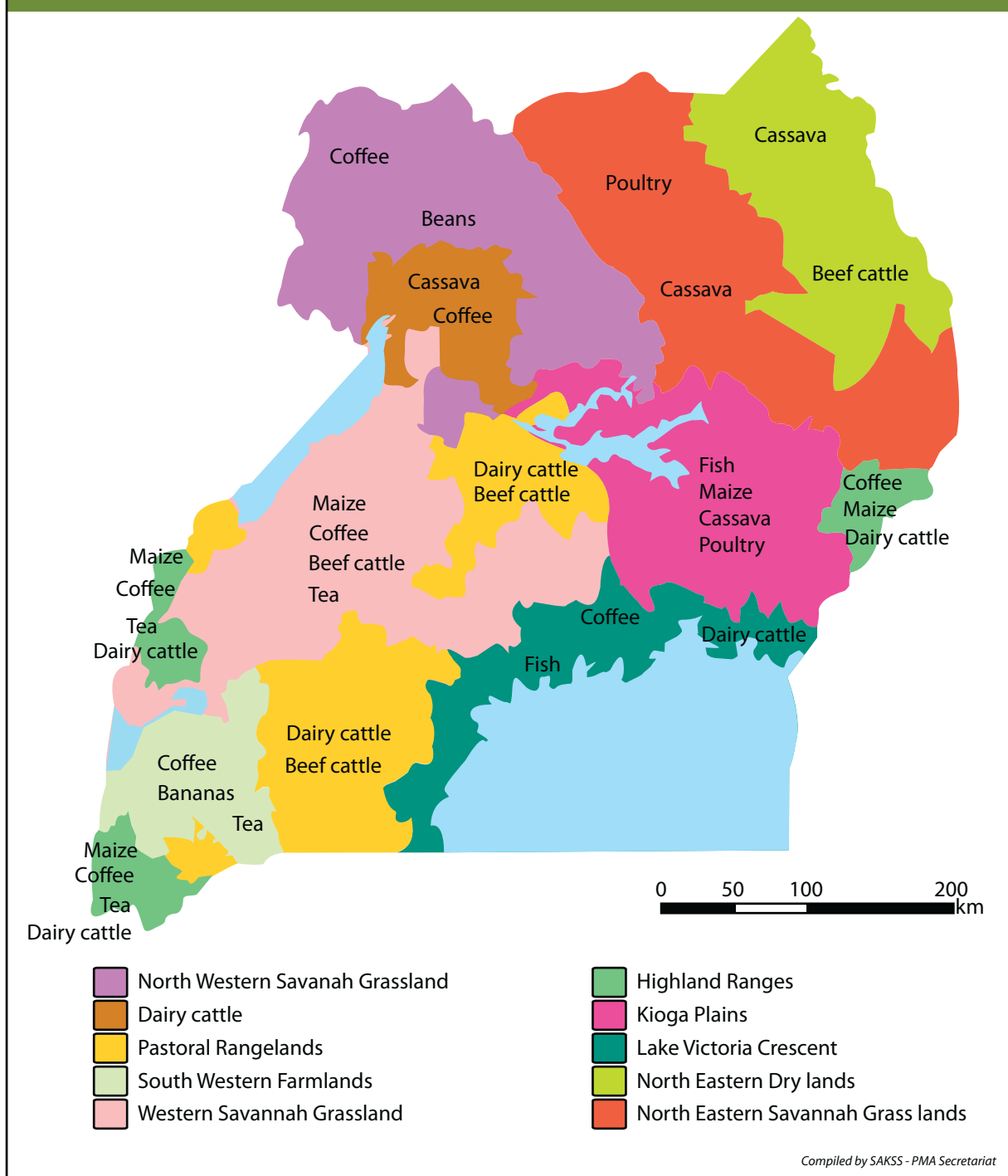
A review of the programme in 2008 concluded that SEP had substantial achievements in the provision of planting and breeding inputs and infrastructure to farmers, in the promotion of value addition, in new market penetration and in capacity building of farmers and other stakeholders. The enterprises were also promoted in the appropriate zones. The concept was found quite relevant.

The MAAIF DSIP has also adopted the concept of strategic enterprises. It will apply a commodity-focused approach where at least one commodity per zone has been selected as strategic. The DSIP will allocate UGX 25 billion per year for the next five years as additional funding to the budgets of programmes promoting these commodities. Figure 2 shows the zones and selected commodities. It should be noted that this list differs from what was presented in the 2008 Agricultural Finance

Yearbook, because of changes in the selection criteria. It should also be noted that not all the zonal enterprises (e.g. maize, coffee, tea and dairy cattle in the Highland Ranges zone) will be implemented in all districts in the zone but there will be further prioritisation within the respective zones.

Despite its implementation challenges, the NAADS programme has also been consolidating and deepening zonal enterprise selection. For example, sub-counties use part of their NAADS budget to procure inputs for priority commodities. The NAADS also introduced a revolving grant to support farmers to upscale production of commodities for which they were already receiving advisory services.

Figure 2: Map showing DSIP strategic enterprises by zone



NAADS is also contributing to the government policy of supporting households to earn at least UGX 20 million annually. This entails selecting six farmers per parish per year and supporting them with inputs to demonstrate selected agricultural enterprises. The enterprises supported should synchronise with the zoning plan.

In 2008/09, about 30,000 farmers countrywide were selected and supported with inputs worth an average of UGX 1.2 million. Table 1 below shows the proportion of total farmers who are demonstrating selected enterprises and their distribution per zone. The shaded cells are showing the zones with highest proportions of farmers by enterprise. For example, the highest proportion of banana demonstration farmers are found in the western savannah grasslands zone (districts of Kabarole, Kyenjojo, Mubende, etc) and the south western farmlands zone (in districts of Mbarara, Bushenyi, Rukungiri, etc).

Table 1: Percentages distribution by zone of demonstration farmers for selected enterprises for FY 2008/09

Enterprise	Zone									
	North-East Drylands	North-East Savannah	North West Savannah	Para Savannah	Kyoga Plains	L. Victoria Crescent	Western Savannah	Pastoral Range-lands	South West Farmlands	Highland Ranges
Bananas	-	-	4	-	13	14	22	16	23	8
Beekeeping	5	31	35	-	21	-	-	7	-	-
Cattle	-	15	21	13	-	-	18	19	-	14
Chickens	3	4	5	1	32	20	13	4	7	12
Coffee	-	-	-	-	-	16	24	11	14	35
Goats	3	14	23	2	21	3	8	12	14	-
Groundnuts	14	18	18	2	36	12	-	-	-	-
Oranges	-	12	19	5	64	-	-	-	-	-
Pigs	-	-	-	-	23	28	24	6	-	13
Rice	-	22	46	3	19	-	-	-	-	11

Source: data from the NAADS Secretariat

Public investments have also been made to demonstrate and deepen use of various production and value addition technologies by farmers and agribusinesses. Examples include milk coolers to some groups in the cattle corridor, honey processing equipment to groups in West Nile region, oil extraction equipment to farmers in oilseed production areas and rice hullers in Eastern Uganda. Others include improved cattle breeds in the cattle corridor, bananas in South Western parts, upland rice seed in most parts of the country and cocoa and tea seedlings in Western and South Western districts.

Production and marketing of agricultural inputs

The national agricultural research system (NARS) has been reformed to include both public institutions (NARO institutes, universities, and other tertiary institutions) and non-public research services (by civil society, private sector, farmers and farmers' organisations). Public research has further been reformed to undertake both national and strategic

research through its six national research institutes (NARIs) and zonal specific research through its eight zonal research and development institutes (ZARDIs).

Examples of technologies that have been developed over the years through public but also through private research include improved varieties of maize, cassava, rice, coffee, poultry as well as labour saving technologies such as motorised maize shellers, rice mills and treadle pumps. Most NARO research has been targeted at specific zones. A NARS baseline survey conducted in 2006 reported that out of 216 technologies sampled, 75 percent of them were targeted to specific agricultural production zones.

Apart from research, public programmes (e.g. NAADS, Uganda Coffee Development Authority, ASPS II/Danida, and SG 2000) and some NGOs (for example, NUCAFE) have been strengthening the capacity of private actors and farmers' groups such as input dealers and community based nursery operators.



Government liberalised input marketing.

Currently it is in the hands of the private sector. Public agencies such as the National Drug Authority and the National Seed Certification Service only implement the policies, laws and regulations governing input marketing. Government also removed or reduced taxes on imported agricultural inputs.

The number and diversity of private plant breeders, importers, wholesalers and retailers operating nationally or in different agricultural production zones has expanded. Though the statistics are not easily available, there are about 14 registered seed companies (involved in seed research and development, production, processing and marketing) up from the initial five in 1999. There are networks of stockists of different types of seed, fertilizers, chemicals and veterinary drugs and suppliers of seedlings and breeding stock in different parts of the country.

A census of agro-input business done in 2004 identified over 2,200 dealers spread across the country. About 82 percent were selling crop inputs

(seeds, fertilizers and chemicals) and 52 percent were selling livestock inputs (veterinary drugs, animal and poultry feeds). The private sector has also set up input marketing and self regulation networks such as Uganda National Agro-Input Dealers Association (UNADA) and Uganda Seed Traders Association (USTA). Currently, UNADA has over 2,000 affiliated members spread throughout the country. Other companies offering specialised services, such as Chemiphar Laboratories Ltd., which deals in seed inspection and testing, have entered the agricultural input industry.

National Service Delivery Surveys in 2004 and 2008 show that there has been a marked improvement in farmers' access to agricultural inputs, especially from private traders (in shops, mobile vendors and markets). For example, the proportion of farm households that reported an improvement in access to hybrid seed increased from 8 percent in 2004 to 73 percent in 2008 and the proportion of households whose source of improved seeds was private dealers increased from 56 to 66 percent in the same period.

Agricultural output marketing and value addition

There are several public sector programmes that are supporting marketing and agro-processing at national and zonal level. They include those that are:

- Facilitating platforms or clusters of all actors in commodity value chains to interface and address issues in the chain. Those that have emerged include coffee, citrus and sunflower platforms.
- Supporting collection and dissemination of market information for selected commodities. Public sector actors include NAADS, Uganda Export Promotion Board, International Institute for Tropical Agriculture, and UCDA. Private sector actors include telecommunication companies, InfoTrade and the Uganda Commodity Exchange.
- Supporting wider availability of agricultural financial services to farmers and agribusinesses through commercial banks, micro-leasing, SACCOs, Microfinance Institutions (MFIs) and publicly funded revolving funds such as the ISFG as well as the Agricultural Credit Facility (ACF) that Government introduced in the national budget for FY 2009/10.
- Constructing physical facilities for marketing, disease control and post harvest handling. Many produce, fish and livestock markets have been constructed by various programmes such as markets in West Nile and South Western region, fish markets in several urban areas, cattle dips in the cattle corridor and fish landing sites on various lakes. Most of these eventually become the property of local governments which often manage them through public-private partnerships. Government has also set up laboratory infrastructure for quality control, such as the fish laboratory in Entebbe.
- Supporting farmers and farmer groups to acquire simple primary processing technologies such as ram presses, maize shellers, rice hullers, milk coolers and honey extraction equipment.
- Supporting farmers organise themselves into farmer groups and higher level farmer organisations such as the Teso Tropical Fruit Growers' Association supported by NAADS,

the Area Cooperative Marketing Enterprises supported by Uganda Cooperative Alliance and the Ministry of Tourism, Trade and Industry (MTTI), and coffee 'depot companies' sponsored by the EU funded NKG Coffee Alliance Project.

- Providing tax incentives to improve production, access to financial services and value addition. For example, from 1 July 2005 an amendment to the Income Tax Act exempted financial institutions from taxation on the interest earned on loans granted for agriculture. The 2008/09 Budget proposed a reduction in taxes on new investments in agro-processing and for processing of locally sourced raw material. Specifically it reduced excise duty on beer made from local materials from 60 to 40 percent and milk tankers were exempted from import duty.
- Government supported the setting up of a Warehouse Receipts System for maize, coffee, cotton or beans. A system of brokers and warehouses has been licensed to operate in the system².

There are several examples of corresponding private investments.

- We are witnessing a growth in farmer-market linkages through private investment in supply chain development through contract farming and out-grower schemes. These forms of agribusiness have expanded and include such commodities as tobacco, sugarcane, conventional cotton, tea, coffee, organic cotton, sorghum, sunflower, barley, goats, paddy rice, palm oil, honey, Irish potatoes, milk and garlic. In general, the companies provide inputs, extension and marketing services to out-grower smallholders and recoup their loans when the farmer sells the crop back to the company. The companies also build business relationships with traders, agricultural lending businesses and transporters to provide services to farmers.
- There has been a tremendous growth in the number and variety of micro and small scale food processing industries. These are often located in towns or trading centres in the zones where the commodity is produced. Even with incomplete data on agro-processing firms collected from 16 districts by MTTI in 2008 and by the PMA Secretariat from 33 districts in 2006,

² See article 1.7 in the 2008 YearBook on Agricultural Finance



the linkage between commodities produced and those commonly processed within zones are apparent. For example, maize hulling and rice milling were dominant in Busoga districts of the Kyoga Plains zone, milk cooling in the western and south western districts in the cattle corridor and brewing of local waragi in the banana growing areas of south western Uganda. Larger processing units locate mainly in areas where there is market except in cases where weight and bulk (e.g. sugarcane) or timely processing (e.g. tea) make it necessary to locate near the production area.

Constraints to investment in agriculture

There are a large number of constraints affecting public and private investments in agriculture. This article lists only a few of them to illustrate the breadth of such constraints. They include the following:

- There are institutional issues such as bureaucratic processes in project approvals, procurements and disbursement of funds; inadequate technical

capacity and low private capacity to implement public projects. Consequently costs escalate, activities, outputs and even geographical coverage are often scaled back and so are effects on the beneficiaries.

- Many public projects within agriculture and with other sectors or within a zone are not mutually complementary and reinforcing to exploit synergies. Even where they do, coordination is a challenge. This duplicates activities and wastes public resources.
- Sustainability of completed public agricultural infrastructure such as rural roads and livestock disease control facilities is another challenge. Normally, government hands over completed projects or outputs to local governments or farmer associations. The experience has been that they often remain underutilised or fall to waste, due to inadequate financial and manpower abilities to utilise and sustain these investments.

- Investments in agriculture are faced with high costs, coupled with poor access to electricity, inadequate water for production, poor roads and difficulties of access to and poorly structured financial services. These factors increase the cost of doing business but also discourage private investment in agriculture, especially in zones where the constraints are particularly common.
- Pests and diseases such as coffee wilt disease, banana bacterial disease and foot and mouth disease affect returns to public and private investments. At the same time, government efforts to address diseases and pests through such processes as research and control are faced with inadequate technical and financial resources.
- The market prices for agricultural inputs such as seeds and fertilizers have been rising in the recent past. This has not only affected public programmes with an input component, such as NAADS, but also private investments in agricultural production and input marketing by increasing the basic cost of inputs. It has also worsened the problem of counterfeit or sub-standard inputs and the already low use of purchased agricultural inputs by farmers.
- The capacity of the public sector to regulate the private sector and to control pests and diseases in agriculture is still low. For example, there is still rampant sale of counterfeit agricultural chemicals when a disease or pest outbreak is reported, despite the presence of the necessary institutions, laws and regulations.
- The public sector often uses the private service providers such as civil works engineers, extension workers and input suppliers to implement project activities. The experience has been that these often have insufficient technical and financial capacity to undertake these projects. This has contributed to rampant delay in public projects in agriculture. On the other hand, the service providers face the consequences and risks linked to delayed payment for provision of goods and services to Government.
- There are different land tenure systems, each presenting its own challenges to investment opportunities in agriculture, e.g. in land management issues, with concomitant effects on productivity and profitability.

Summary and Conclusions

The message in this article is that a combination of public policy reforms and public investments in Uganda has provided an investment environment for private investments at national and zonal levels. The reforms include privatisation of most public marketing and processing enterprises, tax incentives and laws and policies to regulate private sector investment. Public investments, often implemented through programmes and projects, have included setting up physical infrastructure, demonstrations of production and agro-processing technologies as well as capacity building for the private sector and farmers.

The private sector public investments include production, marketing and processing of inputs, out-growers schemes, transport and storage facilities, agro-processing facilities and financial services. Sustaining the momentum of private investments is dependent on continued public investment in agricultural goods and services, coordination and good policy and regulatory choices.

The agricultural zoning plan has provided the public sector with strategic direction for investments and this has signalled to the private sector in which zones and commodities to invest along the various commodity value chains.

Harvesting the full benefits of the zoning policy will doubtless take many years. Indeed, there are still many institutional, financial, technical, infrastructural, environmental and land tenure constraints that are limiting public and private investments in agricultural value chains, both at national and zonal levels.

The government, inter alia through its policy plans mentioned in the second paragraph of this article, is continually addressing these constraints, mindful always that the zoning policy is directed towards substantial medium to long term benefits, rather than quick, short term dividends.

1.3 The 2009/10 Budget and its Potential Effects on Agricultural Investments ¹



Introduction

Policy makers in the Ministry of Finance, Planning and Economic Development have been at the forefront in coming up with incentives to stimulate investments in agriculture and increasing production in agricultural value chains. In the previous editions of the Year Book we discussed the tax relief granted to financial institutions on loans granted for agricultural purposes² and the tax exemption of income accruing from agro-processing for qualifying investors³.

The theme of the 2009/10 budget speech was “Enhancing Strategic Interventions to Improve Business Climate and Revitalize Production to achieve Prosperity for All”.

Agricultural Production and Value addition was the top priority for the Budget. The Sector priorities for this budget include but are not limited to:-

- i) Measures to improve agricultural production and productivity.
- ii) Support to agricultural mechanization, irrigation and agro-processing.

The potential effects of the incentives that were introduced by the budget are discussed below.

Effect of Fiscal Stimuli

In her budget speech, the Minister introduced the following tax amendments:

a) Extension of the tax exemption on income from agro-processing to investments commencing from 1st July 2008.

This will have the effect of widening the net to include investments that had not qualified when the exemption was introduced in the previous budget.

This action is not expected to have a significant impact as it is a retroactive response.

b) Duty exemptions on heat insulated milk tanks.

The effect of this action will be to make the cost of new tanks more competitive as many dairy operators have been buying second hand tanks. Again the impact of this now or in the future is debatable.

¹ Author: Christopher Musoke, Genesis Analytics (Pty.) Ltd

² Agricultural Finance Year Book 2007

³ Agricultural Finance Year Book 2008

c) Reduction of excise duty to 40% on beer produced, grown and malted in Uganda.

This will further encourage the growing of sorghum on a commercial scale. Positive effects have already been felt in Kapchorwa. Beer producers have been encouraged to increase the number of sorghum farmers participating in the supply scheme. The loss of revenue by the government in duties is made up by the higher consumption of beer resulting in higher corporation taxes!

d) VAT exemption on the supply of specialized vehicles, equipment, feasibility studies, engineering designs, consultancy services and civil works related to agriculture.

The effect of this exemption is to lower the cost of agricultural inputs and equipment resulting in more competitively priced products. The anomaly is that spares for exempted supplies incur VAT which in a way negates the original intention. For example, complete sets of irrigation equipment are VAT exempt; however, individual replacement components of these sets, e.g. pumps, incur a VAT charge.

The URA has explained that there are practical challenges in applying the exemption to spares and therefore they are not exempt.

Effect of Increased Public Sector Allocations for Agriculture

The Minister allocated an additional UGX 36 Billion to NAADS to enable it to restructure and consolidate agricultural extension services and integrate them with the provision of inputs to farmers.

This will have the effect of increasing the number of demonstration farms thereby bringing services nearer to those that need them. Advertisements for sub-county Field Extension Workers (FEW) and District NAADS Coordinators have appeared recently in the newspapers. This would indicate that full absorption of the funds will take some time.

The impact of this action will not be immediate and will be in the long term. The implementation has however been dogged by grumblings in the field due to the lack of coordination between the staff of NAADS and the Ministry of Agriculture. This is exacerbated by the fact that NAADS was formed by an Act of Parliament and has an independent Board. There is a lack of cohesion and coordination between the Ministry and NAADS.

The Effect of the Agricultural Credit Facility

The Minister announced the setting up of an Agricultural Credit Facility amounting to UGX 30 Billion to be matched by participatory financial institutions. The total amount of UGX 60 Billion would support medium to large scale commercial farmers to mechanize and purchase equipment for agro-processing. The funds would be lent at not more than 10 percent interest per annum for a maximum period of eight years.

The fund is managed by the Bank of Uganda and the facility was implemented in October 2009. All Licensed Commercial Banks and Credit Institutions are eligible to participate. The facility has been snapped up by the financial institutions indicating the pent-up demand for low cost long term finance in the market. Unconfirmed reports indicate that the applications for reimbursement of the counterpart funding from the facility have exhausted the UGX 30 Billion.

A highly placed source in the Ministry of Finance indicated that additional funds are likely to be added to the revolving fund in the 2010/11 budget.

Smart agri-business people now have multiple incentives to invest in agriculture ranging from low interest long term finance through tax breaks on purchase of equipment to tax exemption on income accruing from agro-processing⁴.

These combined incentives will have the impact of increasing investment in agriculture in the long term.

Conclusion

While several agricultural sector policies have been developed, including the incentives discussed above, the implementation of programs has not been consistent with other government strategies.

This has created un-coordinated interventions resulting in ineffective and inefficient use of resources.

There is a need for the Ministry of Agriculture to take the lead in restructuring and re-aligning the institution under its mandate and work toward achieving the goals in the National Development Plan.

⁴ **Editors' Note:** There is much evidence accumulated over many years that when finance is going cheaply, those with the greatest influence will be the beneficiaries. This is one problem with the Agricultural Credit Facility. The other is the effect on banks, that now have to operate with agricultural finance portfolios where one set of loan assets is at a very different interest rate from the others. This may well cause some financial institutions to become reluctant to participate in the new facility. Clearly monitoring of this is warranted.

1.4 Are Policy Interventions in Uganda's Financial System Enabling Credit Access by the Rural Poor? ¹



Introduction

Rural finance is one of the key inputs of agricultural production and it is increasingly being recognized that the financial system plays a crucial role in the process of economic development.

The Government of Uganda (GoU) has facilitated increased access to financial services by adopting supportive macroeconomic policies that have included sound fiscal as well as monetary policies and prudent regulation of the financial system. Government actions have also led to the establishment of financial institutions where they did not previously exist.

Prior to 2005, policy efforts to improve access to financial services focused on (i) enabling microfinance institutions to transform into deposit taking institutions and (ii) supporting the private sector to increase outreach of financial services to the rural poor. There was a policy shift in 2005 that entailed the adoption of the rural financial services plan/programme. The programme/plan has six objectives, one of which is to ensure access to loan

funds at affordable interest rates and another one concerned with ensuring that all households can have a savings account. This new strategy promoted the Savings and Credit Co-operative Organizations (SACCOs). It envisaged that the SACCOs' features of being member owned and controlled made them the ideal form of institution to address government's aspirations.

The policy preference for SACCOs appears to be partly informed by the traditional view that "appropriate interest rates for agricultural loans should be kept low to promote agricultural development and to assist the rural poor". This has, however, been challenged by empirical studies suggesting that cheap loans did not appear to increase agricultural output or encourage the adoption of new technologies and that they often do not reach the intended rural poor. Moreover, low interest rates frequently undermine the financial viability of lenders and discourage the mobilization of voluntary savings by financial institutions. This observation makes the two objectives of the rural financial services program/plan noted above appear at odds.

¹ Author: Bernard Bashaasha, Makerere University

Despite this, it can be argued that Uganda's current microfinance policy is aimed at providing a reliable and accessible supply of credit for institution building and institutional innovations.

Loan diversion is another common problem with cheap credit and in the Ugandan case this is nurtured by the low and uncertain returns to agricultural investment as a result of climate and market risks. Disbursing loans in kind as is currently done under the NAADS might help minimize loan diversion. However, it does not necessarily obviate fungibility since borrowers can always sell unwanted inputs in secondary markets and realize cash to buy other goods and services. The extent to which this is happening with NAADS support is not yet known and warrants investigation. The gap between the stated and the effective interest rates is another important variable to watch.

Anecdotal evidence suggests that the savings mobilization objective of the rural financial services programme is not being adequately pursued. It is hard to come across a clear strategy spelling out how this objective is supposed to be met.

Some of the reasons for the inadequate rural savings mobilization in Uganda include the high levels of poverty, lack of gainful employment, high expenses on social services (health, education etc) and perhaps even more important, the extended family that tends to overstretch meagre family resources. Whereas complex modern societies, characterized by the nuclear family, share responsibility, including losses, through established arrangements such as financial and insurance institutions, this is not the case with much of the Uganda society that relies on the extended family for this and other kinds of support.

Any family member with known or perceived savings is usually under social pressure to meet the various expenses of the extended family, including school and medical fees, and man-made and/or natural calamities. This social arrangement naturally drains anyone's resources and is a disincentive on savings. Because of inadequate savings mobilization, government programs such as the Microfinance Support Centre Limited (MSCL) currently depend on resources from various government and donor programs, a practice that is clearly unsustainable in the long run.

Three basic arguments can be advanced in support of a rural savings mobilization policy.

- The first is that there exists significant savings capacity even in rural areas so that policies that focus on improving the services and incentives (such as positive real rates of interest) for rural savers are a better way to help them than is cheap credit. This point was emphasized by Von Pischke et al. (1983) who observed that "if most of the rural population had no savings, the rural poor would have become extinct long ago with the onset of the first emergency".
- The second argument is that effective savings mobilization can help deploy the stock of assets of the rural population in more productive ways.
- The third is that the viability and sustainability of most financial intermediaries depend on their capacity to mobilize savings as this also enables them to access information about the savings behavior of their clients. There is also the adverse effect that financial institutions are likely to have less interest in savings mobilization as a source of liabilities from which to lend, when cheap funds are available through government loans, central bank rediscounts, or loans from international donors.

Policy Interventions

Over the years, the GoU has formulated and implemented a number of policies aimed specifically at streamlining and/or facilitating the smooth performance of rural finance intermediation and, more broadly, at contributing to poverty reduction in the rural areas. Some of these are briefly introduced and discussed in this section.

The Cooperative Societies Act (1992).

This Act provides the Legal Framework under which SACCOs operate. It is an omnibus type of act that subjects all types of cooperatives to the same regulations without taking into consideration the needs of specialized financial intermediaries. It is not entirely suitable for financial cooperatives, a matter which is being taken up by the authorities.

The Poverty Eradication Action Plan (PEAP) 2004/5 – 2007/8.

The PEAP aims to enhance economic development and reduce poverty. The envisaged policy actions



entailed, among other things, reaching out to more rural areas and developing monitoring mechanisms to ensure MFIs meet the needs of small-scale agriculture. A PEAP evaluation (Oxford Policy Management, 2006) noted that the effectiveness of the PEAP has been impeded by poor implementation arising from deficiencies in responsibility and accountability within the public service.

The (Draft) National Development Plan (NDP) (2010/11 – 2014/15)

The NDP identifies financial services as one of the complementary sectors and provides for an objective, “increasing access to affordable financial services, especially in rural areas”. Proposed actions noted in the draft NDP to achieve this objective include: supporting research in product innovation, encouraging and supporting the establishment of an agricultural bank and promoting agricultural insurance via expansion of the GoU agricultural guarantee scheme. The NDP also has a strategy to strengthen the capacity of cooperatives including SACCOs.

The Medium Term Competitiveness Strategy (MTCs)/Competitiveness and Investment Climate Strategy (CICS)

The objective of the CICS and its predecessor, the MTCS, is to support the private sector to become a powerful “engine of growth” and a central pillar for increasing incomes and consequently poverty reduction on a sustainable basis. CICS interventions entail increasing productivity and profitability at firm level by reducing the cost of doing business and creating an environment where private investment is viable. MTCS/CICS has five short to medium term priority areas, one of which is strengthening the financial sector and improving access. Among other things, MTCS lays out GoU policy of maintaining market-determined interest rates for financial services.

The Plan for Modernization of Agriculture (PMA)

The mission of the PMA was to “eradicate poverty by transforming subsistence agriculture to commercial agriculture”. The PMA had seven pillars (priority areas for action), one of which is “Improving Access

to Rural Finance". The areas of action (some of them already overtaken by circumstances) included strengthening the legal and regulatory framework, capacity building for MFIs, privatization of GoU credit projects/programs, privatization of the (now former) Uganda Commercial Bank (UCB), promotion of other MFI initiatives and promoting formal banking system involvement in rural finance. The effectiveness of the PMA appeared at one time to have been undermined by lack of policy stability in Uganda's agriculture sector. This is now being addressed.

The National Agricultural Advisory Services (NAADS) Act of 2001.

The NAADS, implemented through the local government and farmer fora, is currently operating in 79 districts and 1,032 sub-counties in Uganda. NAADS provides in-kind support to farmers through registered farmer groups. Farmer support has a 30 percent subsidy as the recipient is required to pay back just 70 percent of the initial value of the input package received. Whereas support is disbursed in kind, cash repayment into a designated account is required so as to create a sub-county level revolving fund. Levels of repayment are not adequately documented. It is also not clear how the new policy of selecting and supporting six model farmers per parish is being implemented alongside this approach, provided for in the NAADS Act.

The Rural Financial Services Programme/Plan of 2005

This programme was initiated to operationalise the new approach to increasing financial services outreach in rural areas. Its actions included providing support to communities to start SACCOs in sub-counties where none existed, supporting the expansion and consolidation of at least one existing SACCO in each sub-county, providing a source of accessible and affordable wholesale funds to supplement SACCOs' deposit liabilities and to enact the requisite regulatory framework for licensing of SACCOs and supervision of their activities, as well as activities of non-regulated financial institutions².

The Rural Financial Services Programme/Plan implementation framework approved by Cabinet in January 2008.

This cabinet instrument was deemed necessary to address the challenges of implementing the Rural Financial Services Plan that were identified

from field experience. Policy actions included creation of the Department of Microfinance in the MoFPED, empowering the Uganda Savings and Credit Cooperative Union (UCSCU) to form, strengthen and develop SACCOs, creation of the Rural Financial Services Programme Coordination Unit and identification of Post Bank as the Strategic Institution to link the formal financial sector to SACCOs².

The Microfinance Deposit Taking Institution (MDI) Act 2003

The MDI is a regulatory Act passed by GoU in 2003 that allows Microfinance Deposit Taking Institutions (MDIs) to legally take deposits from the public. These MDIs, or Tier 3 institutions, are regulated by the Bank of Uganda (BoU). MDIs are considered additional to Commercial Banks (Tier 1) and Credit Institutions (Tier 2). This Act does not appear to have led to the desired effect in the sense that only four MFIs have been licensed to become MDIs. Moreover, of the four, one has since upgraded to a Tier 1 institution, leaving just three MDIs. This suggests that MDI formation may be regarded more as a transition institutional step, rather than a popular banking model for the long term.

The Plan for Enhancement of Sustainable Financial Services or Microfinance Outreach Plan (MOP)

MOP was launched in 2003. It is an initiative linked to MoFED, in pursuit of PEAP objectives, and is concerned with expanding the outreach of sustainable microfinance in Uganda. As of October 2006 it had reportedly (Oxford Policy Management, 2006) led to the establishment of 12 new MFIs reaching 22,000 new clients. However, the rollout of MOP was judged to have lagged behind due to inadequate funding and it is not clear what the situation is today.

The Prosperity for All (PFA)

The objective of the PFA, launched in February 2008, is to empower households in Uganda to meet basic needs and attain a target gross income of at least Ush 20 million per year. This objective is to be attained through improved agricultural productivity, increased access to financial services and remunerative markets, coupled with value addition. Policy actions of the PFA entail selecting six demonstration farmers per parish and loaning them farm inputs such as planting and stocking

² **Editors' Note:** Those readers interested in an alternative to the 'one SACCO per sub-county' policy should read Article 5.3 in this Yearbook, describing Agarú SACCO in Northern Uganda. This SACCO has demonstrated the advantages of optimal utilization of scarce governance and managerial talent by a policy of expansion into neighbouring sub-counties through branches. - in short, a policy based on having one strong SACCO as opposed to several small weak institutions.

materials and farm tools; this policy is accompanied by supporting the formation of SACCOs at sub-county level.

The Peace, Recovery and Development Plan for Northern Uganda (PRDP)

The PRDP is a US\$606 million, three year, planning framework that integrates and harmonizes all initiatives committed to the rehabilitation and development of North and North-Eastern parts of Uganda. It is premised on what is termed “The 14–Point Guideline Programme”, one point of which is to “enhance microfinance for micro business for ex-Lord’s Resistance Army (LRA) fighters, victims and Auxiliary Forces. Available information indicates that a PRDP results matrix indicating all PRDP activities is still being developed.

Overview of Policy Effectiveness

The success level of the above government policy initiatives in as far as enhancing access to financial services by the poor is concerned can be ranked as mixed. However, progress has been made. Rural penetration by financial intermediaries has increased. A PMA (2006) study found that at the national level 74 percent of the sub-counties visited had at least one formally registered rural financial services institution. It also noted an improvement in the overall ratio of financial services per person to 19,571 persons per formalized rural financial service branch and a modest average distance to the nearest Rural Financial Service (RFS) of 4.4 km. The same study also revealed that nearly 42 percent of the households surveyed were aware of where to go for financial services.

The same PMA (2006) study found that only 11.4 percent of the respondent households had ever accessed or used the services of a financial institution, corroborating an earlier study by IFAD (2003) that reported ten percent of the rural people having access to financial services. The two studies suggest a lack of progress in the three year period of 2003–2006. Meanwhile, a survey by Finscope³ Uganda found that 71 percent of the respondents who saved kept their savings in “secret places” and that a majority of borrowers did so to meet emergency expenses rather than for productive or business investments.

One common characteristic of these policies, policy frameworks and projects is the absence of adequate feedback mechanisms to enable the views, suggestions and lessons learned from key stakeholders and beneficiaries to inform program implementation and the other stages of the policy process. This situation is not helped by the absence of satisfactory provisions for regular monitoring and evaluation since many of the policies and programs have no baselines to benchmark the initial conditions for proper monitoring.

The weakness in the linkages can also be traced back to the patronage relationship that exists between the management/policy making institutions and the other stakeholders and beneficiaries. To the extent that the latter depend on the former for resources, there appears to be a silent agreement that the entity that controls the budget sets the agenda. Such a relationship can only be interrupted if the lower level institutions were able to mobilize their own loanable resources through aggressive savings mobilization programs.

Furthermore, rural finance research both to inform and influence policy design and implementation also remains inadequate. Whereas some research is undertaken by the Bank of Uganda, it appears that no independent rural finance research is undertaken elsewhere including NARO. It is not clear then what sources of evidence inform policy design⁴.

Conclusion / Way Forward

Despite the above mentioned and other policy initiatives, access by smallholder farmers to financial services remains poor. Unregulated financial institutions (Tier 4) that include SACCOs, NGOs with financial components and community based organizations remain the major sources of financial services for subsistence farmers. This partly explains why government policy focus has recently shifted to these Tier 4 financial institutions, especially the SACCOs.

This paper acknowledges and appreciates the speed of reform in the financial services sector since about 2005 and is optimistic that this will be matched by increased access to financial services by the rural poor. Apart from ensuring that policy formulation is better informed by field experience, attention to policy delivery is a prime requirement to address the existing and emerging bottlenecks to increased access to financial services in rural areas.

³ Finscope Report 2007

⁴ **Editors’ Note:** This is only partly true. Considerable practical research is ongoing in a number of government and donor projects, in the form of pilot programmes. Many of these have been the subject of articles published in former editions of the Agricultural Finance Yearbook, as well as in the present edition.

Some of these bottlenecks include: a slow start to mount **financial literacy** programmes in rural areas, the long **distances** to rural finance institutions, lack of **collateral, limited knowledge** about the operations of the financial organizations, **fear of arrests and loss of property**, high **interest rates**, lack of reliable means of **re-paying loans** and lack of bank accounts or group membership as pre-requisites.

Others include, the **short pay back periods** and lack of credibility of some financial service providers. Also needed are ways and means of mobilizing voluntary private savings in rural areas and interest rate policies that sustain positive real rates of interest most of the time, coupled with greater emphasis on improving the overall quality of financial services provided by the existing markets.

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1.5 Translation of Research Findings into Agricultural Investment ¹



Introduction

Despite its importance, agriculture in Uganda has continued to face serious challenges that are compounded by low levels of both private and public investment. Some on-farm characteristics are: low productivity with declining soil fertility (Table 1), limited use of productivity-enhancing inputs and high losses due to pests and diseases. As a result, real growth in output declined from 5.6 percent in 1999/2000 to -0.6 percent in 2004/05, then changed to 0.5 percent in 2005/06 and 1.9

percent in 2006/07 (World Bank, 2006). Yields per unit area of most crops have remained more or less constant for some years. Yields of cereals did increase (by 34 percent between 1996 and 1999) but have flattened out or declined thereafter (PMA Evaluation, 2005).

This downward production trend has been experienced in the crops, livestock as well as the fisheries sub-sectors.

Table 1: Change in Productivity: Yields (Kg/Ha) of Major Crops, 1999 - 2006

Crop	Average yield (kg/ha)		Change (%)
	1999	2006	
1. Simsim	114.06	277.80	144
2. Cassava	401.47	543.70	35
3. Sweet potato	1,664.20	2,070.20	24
4. Millet	583.08	718.70	23
5. Maize	1,399.50	551.40	-61
6. Beans	988.36	358.30	-64
7. Coffee	1,215.03	368.70	-70
8. Banana	8,593.96	1,872.10	-78

Source: Agriculture Sector Programme Support - External Monitoring Unit (EMU), 2007.

¹ **Author:** Tom K. Mugisa, PMA Secretariat, MAAIF

Table 2: Yield gap of selected crops (Kg/ha)

Crop	On farmers' fields	On Research station	Yield gap ² (%)
Maize	551	5,000 - 8,000	807 - 1,352
Beans	358	2,000 - 4,000	459 - 1017
Groundnuts	636	2,700 - 3,500	7324 - 450
Bananas	1,872	4,500	140
Coffee	369	3,500	848

Source: EMU, 2007 (some values rounded)

Agricultural opportunities

Nevertheless, there are many investment opportunities in agriculture. For example, there is great scope for increasing farm level productivity (see Table 2). In Uganda annual fertilizer use is 1kg/ hectare compared to 6kg per hectare in Tanzania and 31.3 Kg per hectare in Kenya. On the market demand side, the changing regional (South Sudan, Kenya) and international trends in agricultural markets mean improving prospects for trade both in traditional and non-traditional products.

There is much unused arable land in some parts of the country and 18 percent of the surface is covered by water. Over 60 percent of land suitable for formal irrigation (120,000 hectares) has not yet been utilized. The percentage of people in agriculture has also been increasing (66.4 percent in 2003 to 75.1 percent in 2006).

Government recognizes the fact that the country's agriculture sector cannot be sustainable without science-based technology - providing solutions for the agricultural modernisation challenges as well as seizing emerging opportunities. This explains the increased governmental focus on enhancing agricultural productivity and value addition.

National policy framework

This science-based approach is fully in line with the country's 30-year Development Vision Framework, to be implemented through six 5-year National Development Plans (NDP) in which agriculture is one of the core sectors. The first of these (2010/11 – 2014/15) has the theme, "Growth, Employment and Prosperity for Socio-Economic Transformation". It is aimed at transforming Uganda from a peasant society to a just, peaceful and prosperous middle-income country with a per capita income of at least US\$1,000³.

The new National Agricultural Research System (NARS) is more relevant and responsive, in a sustainable manner, to the needs of subsistence farmers without necessarily compromising sound scientific judgment. The research policy is grounded in the overarching government policies of decentralization, liberalization, privatisation and increased participation of the people in decision-making.

NARS (www.naro.go.ug) is a major pillar of the Plan for Modernisation of Agriculture (PMA) [www.pma.go.ug] and the agriculture sector "Development Strategy and Investment Plan (DSIP)"⁴ [2010/11-2014/15]" (www.agriculture.go.ug).

Research Agenda

Food crops production accounts for at least 65 percent of the country's agricultural GDP. There are also over 20 crops research related programmes that dominate most of NARO activities and have the largest concentration of both human and financial resources. The programmes implemented at various Public Agricultural Research Institutes (PARIs) cover a broad range of issues such as breeding for disease resistance (banana and coffee wilt), yield improvement (e.g. bean varieties: K132 [CAL96] & K131 [MCM 5001]), drought tolerance (maize), and nutrition (orange fleshed sweet potatoes). More detail follows in Box 1 below.

Public Sector Investment In Research

Given the size of crops research programme described above, a lot of resources are required. Indeed, over sixty percent of the total research resources are allocated to these programmes. The rest of the research agenda is funded using slightly over thirty percent of the total research resources.

² Yield gap is computed by dividing the difference between research station yield and farmers yield by farmers yield, expressed as a percentage.

³ Per capita income range for middle income countries is US\$976 – 11,905

⁴ GoU-MAAIF: Agriculture Sector "Development Strategy and Investment Plan (DSIP): 2010/11-2014/15".

Investments are needed not only for the generation of relevant technologies, practices and strategies for agricultural development, but also for the partnerships and collaboration that translate this new knowledge into use as innovative solutions to various constraints along the agricultural value chain.

Over the period 1990 to 2000, public agricultural research investment as a percentage of Agricultural GDP remained below 1.0 percent. The World Bank recommends 2.0 percent Agricultural GDP as adequate investment by developing countries. The International Food Policy Research Institute (IFPRI) estimated the returns to research in Uganda in the order of 50 percent - a high rate relative to other types of investment. Therefore it pays to invest in research.

Box 1: NARO Public Research Institutes and Mandates

A Public Agricultural Research Institute (PARI) is a body corporate with perpetual succession and may sue or be sued in its own name (National Agricultural Research Act, 2005). Among its activities it conducts training for other agricultural research service providers such as: universities, tertiary institutions, farmers groups, civil society organizations and the private sector. PARIs are of two categories: National Agricultural Research Institutes (NARIs) and Zonal Agricultural Research and Development Institutes (ZARDIs).

There are six NARIs (listed below) the objectives of which are to manage and carry out agricultural research of a strategic nature and of national importance. Research areas include: generating technologies for resistance to pests and diseases, drought resistance, higher yields, improved quality, agronomic and processing packages.

1. National Crops Resources Research Institute (NACRRI) at Namulonge, Kampala.

- Banana, cassava, Solanum (Irish) potato, sweet potato, yams, cereals (maize, rice), beans, coffee, oil palm and cocoa (at Kituza, formerly Coffee Research Institute), horticulture (passion fruits, citrus and mangoes), integrated pests and disease management.

2. National Agricultural Research Laboratories (NARL), Kampala.

- Appropriate Technology and Agricultural Engineering, Plant Genetic Resources, Agrometeorology, Food Bio-Science (product development and quality assurance), Agricultural Bio-technology (at Kawanda), Biological Control, Post Harvest (on-farm transport, drying, processing, storage and utilisation), Soils, Soil fertility management and Water conservation.

3. National Fisheries Resources Research Institute (NaFIRRI), Jinja.

- Capture fisheries, fishing technology, fish production (aquaculture) processes (fry production and feeding), aquatic environment and post-harvest handling.

4. National Forestry Resources Research Institute (NaFORRI), Kampala.

- Farm Forestry, Natural Forests, Plantation Forests, Forest products and services, Pests, disease and fire management, Socio-economic and information management.

5. National Livestock Resources Research Institute (NaLIRRI), Tororo.

- Animal production, animal health, pasture development and utilisation.

6. Serere National Semi Arid Resources Research Institute (NSARRI), Soroti.

- Cotton, groundnuts, sesame, sunflower, sorghum, millet, legumes and animal production

Zonal Agricultural Research and Development Institutes (ZARDIs): The objectives of the ZARDIs are to manage and carry out agricultural research whether applied or adaptive for a specific agro-ecological zone. They develop and ensure adoption of technologies based on recommendation domains mapped out on basis of the country's agro-ecological zones. The ZARDIs that are currently operational are located in: Kachwekano, Mbarara, Bulindi, Mukono, Ikulwe, Serere, Bulegeni, Nabuin, Ngetta, Kitgum and Abi.

Accessing Research Results

The weak linkage between agricultural research and advisory services partly accounts for the poor uptake of improved technologies. End-users cannot adopt technologies that they do not know sufficiently well. They need appropriate information in order to make the right decisions and investments. Therefore, it is important to ensure that technologies that are generated are adequately and effectively disseminated.

An IFPRI⁵ survey found that, among households who were aware of modern inputs or technologies and had received advice on their use, adoption rates were significantly higher than households who were also aware of these inputs or technologies but had not received advice on their proper usage. This is a significant finding in that appropriate advisory services, not only on enterprise selection but also on input use, can have a significant productivity impact.

The activities involved in channeling research results to end-users are part of NARO's outreach programme. The programme targets strengthening the research / extension interface and also establishes linkages with local governments and civil society. The focus is on end users, with attempts to enhance their participation in problem identification, prioritisation, planning, experimentation and research evaluation. Use is made of farmers' groups, wherever possible, together with other participatory approaches, such as farmer field schools.

These efforts are potentially very worthwhile. An evaluation of NAADS has found *"clear positive impacts on adoption of improved technologies, productivity and per capita incomes."* (NAADS Impact Evaluation - IFPRI, 2009). The same exercise also undertook a benefit-cost calculation which, even including the cost of agricultural input distribution and interest payments on the loans acquired to finance the programme, showed a rate of return of 240-270 percent.

Assessment Of Research Performance

Over the last seven years (2003-09), NARS has developed up to 218 improved varieties, breeds and prototypes for increased yields, food security and incomes. This includes 85 new crop varieties with their required agronomic practices. In addition,

enterprise specific constraints have been addressed. These include: maize streak virus, groundnut rosette virus, cassava mosaic virus, coffee and banana wilt diseases.

Other opportunities pursued include growing eucalyptus trees, upland rice production, improved feed resources for dairy cattle and goats, water management for livestock and crops on smallholdings, improved breeds of pigs, chicken and goats for women and children, especially in northern Uganda, new rice, apple and wheat varieties for highland ecologies; hybrid sunflower varieties for high yields and oil content. Additional livestock and fisheries technologies developed include: fodder bank and feeding practices, various disease control practices and aquaculture practices to suit local conditions.

All in all, investments in agricultural research have had a significant impact on rural household incomes and on poverty reduction. The success is attributed to the new knowledge (technologies on crops, livestock, fisheries and forestry) that enhanced production and productivity.

However, despite achievements to date, it is recognized by informed observers that there is still a very long way to go before the potential of research-led productivity boosts in agriculture is fully realized.

Contribution Of Research To Investment

Addressing Disincentives

One of the biggest challenges to agricultural modernisation in the country is the **"reversal of trends"** in the sector. The reversals have been largely due to several factors such as frequent incidence of serious animal and crop pests and diseases, steady decline in soil fertility and over-reliance on rain-fed farming methods. These "reversals" have been compounded by high input costs and lack of price guarantees. All of these factors have serious implications for investors. This partly explains the ongoing shortage of private medium to long-term funding for agricultural investments. Even when it is available in the form of loans, it is usually too expensive for the type of investments being financed and the expected cash flows generated.

In the last ten years, bananas, cassava and coffee have suffered serious wilt diseases. The banana

⁵ Benin, et al, (2007). "Agricultural Growth and Investment Options for Poverty Reduction in Uganda" International Food Policy Research Institute (IFPRI). December 2007.



bacterial wilt disease, which was first reported in 2001, has caused a national loss estimated at US\$700b (US\$ 360 million) per annum. In a study, titled “*Xanthomonas Wilt*”, in *Plant Disease Journal* (May 2009) it was noted that the overall economic loss to Uganda due to the disease is estimated to be \$2b to \$8b over a period of 10 years.

Another example is the coffee wilt disease, which since 1993, has destroyed over 12 million plants, affecting most of the coffee-growing districts in the country. This has resulted in lost export revenue of close to 30 percent per annum.

Other ‘reversals’ include climate change effects – floods (2007 in Eastern Uganda) and drought (North-eastern Uganda) leading to huge losses for investing farmers. Research implications lie in the development of crop varieties that have a degree of resilience to factors such as moisture stress.

Thus agricultural research remains an important source of solutions for the mitigation of the risks such as those listed above. This highlights the role of agricultural research in making agriculture more

attractive to investors. Indeed the country’s NARS has to a great extent been successful in addressing the above challenges by providing more resistant varieties as well as recommending agronomic practices that minimise the diseases challenge – contributing immensely to driving or supporting investments in farming as well as in the post harvest management of farm products.

Assessing research-based investment

Now the challenge lies in ensuring that the research results lead to on-farm investment and implementation. So far the record in Uganda is patchy. The NARS Policy on the **research-extension-action-investment chain**, if it continues uninterrupted, is expected, in the long run, to largely meet expectations. Nevertheless, the approach is new, it is still in its early stages of operationalisation and doubtless there are challenges to be overcome. One of these is to maintain the momentum of implementation. By doing so the officials concerned should be able to address the existing large disconnect in the chain between ordinary farmers and the research/extension structure.

Subsistence farmers continue to invest their resources in agricultural enterprise production that is not adequately guided by modern science, and is unlikely to pass the tests of profitability and/or socio-economic justification.

There are also a growing number of small, medium and large scale commercial farmers and related investors who are increasing their investments in agricultural production and along the value chain based on scientific solutions (e.g. improved planting and stocking materials). Some in the value chain are already using a variety of agricultural raw materials – such as fruits for juices production and packaging. The good news is that the number continues to grow as prices of most agricultural products remain high.

Agricultural research and its technology products are a major input for increasing production and productivity. To efficiently deliver such technologies, a strong interface between the NARS and the NAADS must be effectively operational. The two agencies are the main bodies assigned to the goal of increasing agricultural production and productivity. Currently the needed interface between NARS and NAADS is relatively weak and needs to be fully operationalised in line with an existing formal MoU between the two agencies.

Effect of the research to investment disconnect

The disconnect between research-extension-action and investment has a profound effect on the overall levels and direction of investment in the country's agriculture. To address the disconnect there is need for a deliberate effort to intensify the value chain approach for agricultural development.

This calls for strategies to mobilize all key stakeholders including potential investors, agro-industrialists, financing institutions backed up by an effective knowledge management system that addresses the information needs of the different stakeholders. These could be on a variety of agriculture related issues such as: market demand and access to markets; enterprise profitability; cost of production; access to affordable financing; food safety; access to technologies for value addition, packaging, storage and distribution.

Information Challenges and Solutions

Population segments that lack access to information are completely shut out of the efficiency, productivity and profitability gains from research, and the opportunity to contribute to the research process in the form of feedback.

Further issues are the packaging of the information, and building end-user capacity to receive, utilize and benefit from it effectively. There is also need for consistency, avoiding conflicting or contradictory information from different government agencies and/or non-government organizations that may be addressing similar development challenges.

Advances in communication technology mean that mass dissemination of information can be achieved efficiently and at relatively low cost. FM radio is of course the method of choice for widespread coverage. Cell phones and internet provide other means.

Response to commercial needs

The country has various commodity based government institutions mandated to develop specific agricultural sub-sectors. Examples include: Cotton Development Organisation (CDO) for cotton, Dairy Development Authority (DDA) for dairy, Uganda Coffee Development Authority (UCDA) for coffee, National Animal Genetic Resources Centre (NAGRIC) for animal breeding and Aquaculture Research and Development Centre (ARDC) for fisheries at Kajansi.

These agencies provide a platform for all stakeholders interested in particular sub-sectors to articulate their development and commercial needs. Based on the needs, the agencies develop appropriate interventions through a participatory process. Some of the interventions have research and advisory services implications.

Private institutions also provide channels for agro-industrialisation and technology commercialization. Large scale commodity producing companies include: Sameer Agriculture and Livestock Ltd. for milk processing; Kinyara, Kakira and Lugazi sugar companies; British American Tobacco (BAT) Ltd; Mukwano Industries Uganda Ltd. for vegetable oil; Tilda Uganda Ltd for rice; and Britannia Ltd for fruit juices.



A number of private sector institutes also undertake research related to agricultural aspects. Sugarcane, tobacco, tea, flowers and vegetable development estates and companies in Uganda implement their own research. The Uganda Flower Exporters' Association (UFEA) owns a small flower research facility in which they evaluate rose varieties from the Netherlands, Israel and Kenya for local adaptation and cut-flower qualities. Likewise, the Uganda Horticultural Exporters Association (HORTEXA) has limited research facilities at Magigye to ensure vegetables (french beans) meet the European market quality demands. Crop protection and quality concerns are the key research and development activities of these specialized institutes.

The National Union of Researchers and Research Users (NURU) is also an active research partner. It brings together and funds a diverse group of researchers, to undertake social science related research to support policy reforms in the country. Medbiotech Laboratories undertake research in various aspects of biotechnology.

Farmer groups also play an important role in demand articulation, priority setting and the dissemination of technologies. These include: Uganda National Farmers Federation (UNFFE). Uganda Beef Producers Association (UBPA); Uganda Fish Exporters Association (UFEA) and Uganda Consumer Protection Association (UCPA).

Role of investors

Investors operating at various levels of the value chain have an important role to play, particularly in the feedback process. In the past such private sector commitment to agricultural research has been elusive, and much scope exists for greater involvement. The key challenges have been the capacity and skills for participating in multi-institutional teams, risks (mostly cited by financial institutions), aversion for public accountability procedures, access and ownership of public goods and financial contribution to partnership activities.

However, under the improved enabling environment and through a partnership approach, private service providers can be empowered to contribute significantly to agricultural research. One of the instruments for this is the competitive grants scheme, which has already proved successful, particularly through Zonal Agricultural Research Institutes across the country.

Another area of interest to the private sector is multiplication of breeder and foundation seed, germplasm dissemination and technology commercialisation through public-private partnerships. There is also an important aspect of outreach, namely to empower the private sector to participate in commodity chain innovation processes and research funding.

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Chapter Two

Production Investments

2.1 Animal Powered Mechanization: Productivity Gains and Portfolio Performance ¹



Background ²

Animal draught power essentially refers to the use of animals to provide the motive energy required for the running of agricultural machinery to increase farm productivity and labour efficiency. The importance of labour as a major factor of production in Uganda cannot be over-emphasized, as the absence of efficient labour contributes greatly to the low levels of land use seen in many parts of the country.

Many farming households own or have customary use of or access to large, fertile areas of land especially in parts of Eastern and Northern Uganda, but have been unable to utilize it efficiently and effectively to boost production and thus increase household incomes. The main reason for this situation, linked in part to the disturbances caused by the LRA and other law-breakers, has been the lack of the means to cultivate the available land areas.

Therefore, any technological innovations that result in an increase in labour productivity deserve to be supported by all major stakeholders in improving the production and profitability in agricultural value

chains. Such stakeholders include Government, donor agencies, and financial institutions. Apart from animal draught power, farm mechanization for enhancing labour productivity can be provided by engine power, mainly provided by tractors. Compared to animal draught power however, tractor mechanization is much more expensive and more difficult to manage.

Centenary Bank's agricultural lending product was started over ten years ago with the aim of providing short-term finance to smallholder farmers involved in any productive agricultural enterprise. Animal traction lending built on this basic product. It presented the opportunity to extend medium term financing to individuals interested in acquiring the agricultural equipment required for boosting labour productivity and increasing household incomes.

Benefiting from the collaborative partnership with the GTZ/Sida FSD Programme, Centenary commissioned baseline research to assess the economic and financial viability of investing in farm power, in order to explore the potential for

¹ **Author:** Julius Segirinya, formerly Centenary Bank

² See also the 2008 Yearbook on Agricultural Finance for an article by the same author on lending for investments in ox traction.

developing medium term financing products. The GTZ/Sida-funded exercise concluded that there is a huge effective demand for draft animals and traction equipment (oxen, yokes, chains, ploughs) in Eastern and Northern Uganda. This prompted Centenary Bank to develop and subsequently roll out the animal traction loan product.

Roll Out and Current Status

Following a successful pilot conducted in Kumi and Soroti Districts, Centenary planned to extend the animal traction loan product to Kapchorwa, Lira and Masindi. It is worth noting that the animal traction term finance product was designed as a structured product involving more than two parties. The farmers have to identify an individual/organization capable of supplying animals that are well suited for providing draught power.

The potential supplier of draught animals is then recommended to the Bank by the farmers and asked to open a settlement account where the payments from the farmers' loan proceeds are to be deposited after the animals have been handed over to the farmers. If approved, the animal supplier is paid after presenting an invoice to the Bank together with a signed document or standing order authorizing the Bank to transfer funds from the farmer's account to the supplier's account.

The roll-out to Kapchorwa was faced with the difficulties of identifying an individual or an organization who could assure a continuous supply of draught animals to meet the demands of the clients. Centenary's Kapchorwa Branch appraised over 25 animal traction loan applicants and took the initiative to establish a partnership with a farmers' organization that had shown interest in supplying suitable, well-trained animals for traction.

The situation in Lira did not favor the immediate roll-out of animal traction term finance, as the Ministry of Agriculture, Animal Industries and Fisheries imposed a ban on the movement of animals in and out of the Lango sub region following the outbreak of foot-and-mouth disease in early 2008.

The Lira Branch nonetheless went ahead with the mobilization efforts, and client appraisals, pending the lifting of the ban. To date the Bank has appraised over 150 animal traction loans to farmers in Kapchorwa and Lira branches. This will bring the total value of loans made under animal traction credit to about UGX 180 million.

Productivity Gains

The term finance animal traction loan product has contributed to an increase in the area of land cultivated by farmers, which has in turn led to an increase in crop production. In many cases, the loan has been extended back-to-back or alongside other crop production working capital facilities, thereby ensuring the complete package that farmers require to invest in a crop season.

Each farming household with an animal traction loan has managed to cultivate at least 4-6 extra acres of land, on average, at the start of the season, putting the average amount of land under production at 7-11 acres as opposed to about 3-5 acres with human powered technologies. In addition, the beneficiary households that already possessed a set of traction equipment and animals have doubled the area of land under cultivation to up to 22 acres during the first season.

The high demand for animal traction technology has also enabled the beneficiary households to increase their incomes through hiring out of their animals. By providing ploughing services to neighboring farmers, a household is able to realize Ushs 90,000 a week during the peak season. The farming households that own more than one set of traction equipment and animals have especially made gains of over Ushs 300,000 per month, as the second set of equipment is normally available for renting.

As already mentioned in the foregoing, the principal aim of accessing animal draught power technology is to boost labour productivity by reducing the labour requirement per unit acre of land. There is also a timeliness factor operating. A farmer without draught oxen could increase the area cultivated by hiring labour. For example, hiring four labourers would enable an additional 2.5 acres (1 ha) to be planted. However, it would take two weeks for the task to be completed. With a span of oxen the same task could be completed in five days. Under rainfed farming every additional day's delay in planting seed means potentially lowering the eventual crop yield.

The cost of hiring four people for a period of two weeks to cultivate an additional one hectare (2.5 acres) is at least UGX 280,000. This is substantially more than the cost of hiring a span of oxen (UGX 75,000) to perform the same task. For a farmer who



owns a span of oxen the cost of purchased inputs (veterinary medicines) comes to about UGX 35,000 per ploughing season.

Therefore, the farming households that employ animal traction technology are able to save about UGX 1,000,000 in labour costs on every 10 acres of land cultivated. This is significant, and when coupled with the income from hiring out animals, the benefits that accrue to the household from the use of animal traction are equally significant.

Contribution of Animal Traction Credit to Centenary's Agricultural Loan Product Range

As noted above, the agricultural loan product that was designed and rolled out at Centenary Bank ten years ago was the Smallholder Production Loan. Since its introduction, demand for this product has grown consistently, with over 15,000 smallholder farmers currently benefiting from this facility.

In an effort to serve all activities along agricultural value chains, Centenary Bank also developed and

introduced a product for agricultural trade and processing to target individuals dealing in produce trade and small-scale agro-processing. To date, this product has benefitted over 30,000 individuals in urban and rural areas.

The animal traction loan product is in relative terms a very recent product that was introduced only two years ago. Its recent introduction notwithstanding, the term finance Animal Traction Loan has very unique features both in terms of its design and potential impact on the livelihoods of the beneficiaries.

Firstly, the Animal Traction Loan was Centenary's first term agricultural finance product offering loans for periods exceeding one year. This is a major breakthrough in so far as it has contributed substantially to the Bank's goal of providing a range of diversified products that suit the varied needs of its clients.

Secondly, many existing clients had expressed the desire for accessing term finance for investment in fixed assets like milling machines, maize threshers,

rice hullers, single-axle tractors, and ox-ploughs. Animal traction lending led the way in Centenary's move towards longer term advances, a policy that enables clients to acquire fixed assets that have long-term impacts on their social well-being and economic livelihoods.

Centenary Bank has so far extended only a modest number of animal traction loans. Nevertheless, the impact on the beneficiary clients' ability to invest in agricultural production in a timely manner and with enhanced labour productivity is undoubtedly significant. As the Bank continues to roll out the product to more branches and more clients within the same branch, it is expected that the impact of animal traction lending will become even more significant.

Demand for Other Ox-drawn Equipment

Animal draught power can be applied to many alternative uses apart from providing traction of ox-ploughs during land cultivation. The animals can be used for drawing planters, weeders (cultivators), ox-carts and for pulling other forms of transportation. In Kapchorwa, particularly, where the landscape is mountainous with very steep roads, a number of clients have requested loans to purchase animals to transport water and farm produce.

During sensitization workshops in parts of Soroti and Kumi, many farmers expressed interest in taking two sets of animals to be used both for ploughing and for transportation of farm produce. The request to use animal draught power for weeding, although highly beneficial, was not mentioned by a single farmer, due to the lack of awareness of this technology³. The farmers' interests were more in line with the historical traditional use of animals for draught of ox-ploughs.

Centenary Bank, so far, has not been able to finance farmers for the acquisition of animals for use in activities other than animal traction for ploughing. This is mainly because these activities and their effect on client productivity have not yet been well understood. In addition to this, there is a risk of diverting oxen from ploughing to non-productive activities that could impair a client's capacity for loan repayment. A cautious approach is therefore required and the decision will only be arrived at after careful study of the impact of these activities on the clients' abilities to produce optimally.

It should be noted though, that clients whose cash flows can support the acquisition of an extra set of animals for use in activities which do not have a direct effect on production, like daily transportation of water, etc., will be considered in the next cycle of animal traction credit.

³ **Editors' Note:** Since effective weeding is a major determinant of the eventual crop yield, and labour is a limiting factor in adequate weed control, the use of ox-drawn cultivators could have a marked effect on smallholder productivity and income. It is remarkable that in Uganda one sees so few ox cultivators, despite the capacity to locally manufacture these implements to a high quality standard.

2.2 Prospects For Mechanical Equipment Use In Agricultural Production And Processing In Uganda ¹



Introduction

Uganda has used rudimentary techniques and tools of production from time immemorial. The heavy reliance on such primitive and low productive tools has curtailed the country's capacity to propel its agriculture beyond subsistence levels. This is because farmers are not able to open up adequate acreage. Even when a farmer has been able to increase the area ploughed, the eventual harvest is normally dictated by the amount of planted land that the household is able to weed effectively – a major bottleneck when hand hoeing is the technology used.

The country also heavily depends on rain-fed agriculture. While this worked in the past it is no longer a viable option under the current worldwide negative impacts of climate change and climate variability. Meaningful crop productivity now calls for proper management and use of water to avert periods of crop water stress. Further down the value chains, agricultural products are subject to high postharvest losses, and by poor quality leading to low market prices.

To transform its agriculture from subsistence to market-led production, the country must rigorously move towards replacing human muscle-powered tools with equipment powered by fossil fuels, electricity and renewable energy sources including solar and wind power. Simple, tested and generally affordable technologies now exist that are within the manufacturing and/or servicing range of artisanal workshops in the country.

Typical equipment for on-farm production and for artisanal processing

Agricultural mechanization embraces the manufacture, distribution and operation of all types of tools, implements, machines and equipment for agricultural development, farm production, crop harvesting and primary and secondary processing.

Based on the sources of power used to operate the above tools and equipment, (human muscle, animal power, and mechanical power), mechanization can

¹ **Author:** Eng. Odogola Richard Wilfred, Senior Lecturer and Head Mechanization and Irrigation Department, Busitema University

broadly be classified into three levels, as set out below. For each of these levels pictorial examples are given of equipment types that have been tested in Uganda, with significant farmer adoption. Many are suitable for local manufacture and fabrication, under formal or artisanal workshop conditions.

Manually operated technology refers to basic tools and implements powered by human muscle power. These include the hand-hoe, axe, machete and sickle, all of which are still widely used in farming in Uganda. These are rudimentary, exert a lot of strain on the operator, and do little to improve productivity of labour.

Improved manually-operated farm tools and devices have however continuously attracted farmer acceptance and are being used to improve labour productivity.

These include precision jab-planters, hand-pushed planters and weeders for row crops including cotton, vegetables, cereals and legumes; manually-operated sprayers for managing pests and diseases in a wide range of crops including fruit trees; manually operated groundnut and maize shellers; manually operated water pumps, etc.

The new equipment is not only labour and time-saving, but also significantly reduces the cost of production, with increases in profit margins for the farmer. Those for crop processing increase labour productivity, reduce postharvest losses as well as improve quality and marketability of the end product. Examples of the new technologies that are within reach of production techniques and skills typical of workshops in Uganda are shown in pictorial form in Figs 1a – 1b below.



Fig 1a Treadle pump for water lifting

Treadle pump for water lifting.

- Gross weight: 15 – 17 kg
- Discharge of 80 – 100 litres per min
- Can pump/lift water to total head/height of 6m
- Can be operated by both children and adults (both male and female) depending on depth of water source and weight of the operator.
- Used in water lifting for household use, small-holder irrigation and for livestock watering

This equipment is now fabricated and marketed by a number of workshops in Uganda including AEATREC-Namalere, Busitema University, etc.



Fig 1b Typical hand operated groundnut sheller

Typical hand operated groundnut sheller

- Gross weight: 20 – 22 kg
- Capacity: shells 6 – 8 bags of groundnuts in 1hr
- Can be operated by both children and adults (both male and female)
- Portable and easily movable from one location to the other
- May be used for commercial shelling of groundnuts by individuals or group of farmers



Draft-animal power technology, refers to a wide range of implements, machines and equipment used in agriculture and powered by work-animals, which in the case of Uganda include oxen and donkeys. Third World countries such as India and China also still significantly depend on work animal technology, despite their improved industrial equipment manufacturing capacity.

In the case of Uganda work animal technology is still widely used in the eastern and northern parts of the country and some implements can be locally made. For example, the Soroti Agricultural Implement and Machinery Manufacturing Company (SAIMMCO), makes a whole range of animal drawn implements (ploughs, planters, weeders, groundnut lifters, etc, besides an assortment of postharvest processing equipment.



Fig2a: Animal drawn plough

Typical ox-drawn plough

- Gross weight: 35 - 38 kg
- Used by a pair of well trained & healthy oxen
- Mean work rate of 0.25 acres/hr or 1 acre in 4 hrs for good span of oxen
- The plough can accommodate attachments for other farm operations including: weeding, planting, groundnut lifting, etc.
- Can be operated by both men and women.

Animal traction can also be used for a variety of on and off-farm operations, including transport of farm inputs and outputs, and road construction works,



Fig 2c: Groundnuts lifter

Animal drawn groundnuts lifter

Typical characteristics:

- Frame made of heavy-duty steel pipe
- Gross weight: 25 kg
- Cheap and affordable by smallholder farmers
- Used by a pair of well trained oxen or donkeys
- Mean work rate of one acre in 4 hrs
- Can be operated by both men and women
- Easy to operate and cheap to service
- The design can accommodate standard plough components and be operated as an ox plough

Mechanical-power technology: This is the highest level of mechanization used in agriculture today. It includes a wide range (models and sizes) of four- and two-wheeled tractors used as mobile power for a variety of field operations and transport. This level also includes stationary engine- or motor-power

equipment such as maize shellers, grain threshers, coffee hullers, irrigation pumps, grinding mills, etc. Examples of tested and adopted equipment under this category are shown in Figures 3a – 3d. the country to operate and repair such equipment, when spares are available.



Fig 3a: Typical 75 h.p. 4-wheeled tractor

Typical 4-wheeled tractor

- Most 4-wheel tractors used in Uganda are in the horsepower range 65 – 90 h.p., though some much more powerful machines, including crawler tractors, have a place in special land clearing operations and on estates.
- Conditions in Uganda mean that tractors purchased need to be ruggedly constructed.
- Whereas engines are generally satisfactory across the models sold locally, there is evidence that the hydraulic systems of some tractors, designed for less-demanding environments, are not sufficiently strong.
- Fuel consumption is roughly 1 litre per hour per 10 h.p. at working engine speed.



Fig 3b: Kitgum farmer operating Kubota NC 131

Typical 2 wheeled Power Tiller in operation

Typical 2 wheeled Power Tiller in operation
Recommended range for Uganda: 8 – 14 h.p.
The 12 h.p. Kubota model NC 131 tested in Uganda has the following characteristics:

- Multi-purpose designed for both swampy and dry land farming
- Used as a mobile or stationary source of power for various farm operations including pumping water, shelling maize, power generation, grain milling, propelling boats
- 5hr per acre
- Can work for 13 hrs/day ploughing up to 2.5 acres in a three-shift day, i.e. more output than a span of oxen, as these need rest periods
- Uses in average 4.5 litres diesel to 1 acre, compared to 8-9 litres/acre by a 60 h.p. tractor



Fig 3c: Motorized maize sheller

Motorized maize sheller

- Output 1,500 – 1,700 kg/hr/ clean grain
- Percentage of broken grain from 1.2 – 1.8
- Adaptable to both electric motors and gasoline engines
- Can easily be operated by 1 – 2 persons and moved from one place to another

This equipment is ideal for medium to large commercial maize farmers and the seed industry. It may also be used for commercial shelling of maize by individuals or farmer groups. Available at AEATRE Namalere, Kampala.



Fig 3d: Motorized rice huller

Motorized rice huller

Typical characteristics:

- The machine is engine driven but could also be electrically powered
- There is a range of sizes and models to meet any capacity milling need
- Smaller versions are easy to operate and can be fabricated in typical artisanal workshops and are affordable either by individuals or groups of farmers
- Higher capacity ranges may require formal credit facilities to acquire.
- There are currently adequate skills in the country to operate and repair such equipment, when spares are available.

Typical agricultural enterprises that could support engine-powered mechanization

Agricultural tools, equipment and machines are important items used to enhance farm labour productivity and to add value to processed products. To be able to access these items, farmers usually need to arrange bank loans, especially for the more expensive category of farm equipment e.g. tractors and their implements, irrigation kits, as well as motorized shellers and hullers. These items of equipment often handle commercial crops which are vigorously being promoted by Government in a bid to enhance livelihoods in farming households.

Due to formal financial institutions' normal demands for collateral however, smallholder farmers and agro-processors in particular, are often not able to access financial services that may help them acquire such above equipment². They must therefore either possess upfront assets to sell (e.g. land, cattle), or have a viable enterprise (e.g. a shop) that may help in servicing a loan for equipment acquired on credit.

In Uganda, popular tractor power usage ranges from 8–14 h.p. for walking tractors and 45 – 90 h.p. for two-axle tractors, all depending on acreage and type of soil. Higher tractor power is normally used in

² **Editors' Note:** The introduction of leasing in Uganda (see Article 4.1 in this issue of the Yearbook) has eased the collateral problem for some would-be investors in agricultural machinery.

extensive farms, for example sugar cane production and haulage. For average farming operations, typical cost tables for a 90 h.p. 4-wheeled tractor are given below.

Table 1: Costs of Owning and Running a Tractor (e.g. 90 h.p.)³

Item	Cost per hour \$
Ownership costs	
Recovery of capital cost over 7,200 hours	4.67
Interest – opportunity cost of capital invested (at 11% p.a.)	3.2
Insurance – at premium rate of 3% p.a. on diminishing value	0.45
Total ownership costs per operating hour (rounded)	8.3
Operating costs	
Fuel 8 litres/hour at \$1.20 per litre	10.8
Lubricants (5% of fuel cost)	0.54
Repairs and replacement parts (excluding tyres)	5.51
Tyres: at life expectancy of 1,500 hours	1.28
Total operating costs, excluding driver and helper (rounded)	18.13
Driver + helper	2.00
Total owning and operating costs	28.5
Assumptions: Initial purchase price new, \$42,000 Working period, 5 years, at 1,440 hours usage per year Residual value 20% of purchase price	

Challenge of agricultural equipment servicing and repair facilities in Uganda.

During the 1960s the Government of Uganda, under the then government-managed “Tractor Hire Services”, made significant efforts to establish a network of tractor and implements maintenance and repair facilities country wide. Government also trained significant numbers of technicians and artisans for the management and repair of the equipment. A total of 66 Class 1 workshops (meant to mainly handle tractor servicing and minor repairs) and 17 Class 2 workshops (geared to handling more complicated equipment repairs) were established. The Central Workshop at Namalere was set up as a referral facility for all major repairs, including assembly of new agricultural equipment imported in knocked-down form.

In the 1980s government adopted a new policy, divesting the management of tractorization to the private sector. The latter was to take over tractor importation and setting up of maintenance and repair facilities. This expectation was, by and large not realized to any great extent, though over the

last two years there has been a significant increase in the numbers of engine-powered agricultural machines in the country.

The Ministry of Agriculture Animal Industry and Fisheries recently developed a comprehensive frame work (draft policy) for a “Private Sector Managed Mechanization System”. The draft policy offers among others, a package of incentives to attract the private sector into this venture. However, at the time of writing (April 2010) the draft policy has still to be approved by Parliament.

Meanwhile, the country is still short of competent servicing and repair facilities for tractors and their implements, including the motorized postharvest equipment discussed above. Coupled with this there is a shortage of spares for some categories of equipment imported into the country.

For motorized postharvest equipment a number of artisans have learnt on-the-job and can satisfactorily operate, adjust, service and repair these items of equipment. The main challenge at times is the lack of necessary spares in-country or of capital to acquire spares, especially in up-country locations.

³ Figures in this example based on costs kindly provided by Farm Equipment Industries Ltd., Kampala



This is an area where financial institutions can play a key role by extending loans to entrepreneurs keen to establish basic repair/servicing facilities and to maintain adequate stocks of appropriate spare parts.

The other challenge is the wide array of equipment models imported into the country. As an example, there was a time when Uganda had a total tractor fleet of 3,200 tractors but this fleet consisted of over 120 different makes and models. This situation constrained the acquisition of the wide range of spares needed for all these models. As a result some of the equipment had to be abandoned almost new, due to lack of spares.

A possible solution to this problem is for Uganda to introduce restrictive legislation/regulations that focus on a small range of any one type of machine, proven effective and efficient and with assured spare parts and familiarity to service personnel. However, under the current free market economy, widely embraced by the country, this option might be difficult to implement⁴.

Sources of mechanization equipment expertise and services in Uganda

A number of companies and workshops are now available in Uganda that can offer a variety of services related to engine powered agricultural mechanization technologies. These can be categorized as those that import and sell mechanization equipment and/or their parts, and those offering repair and maintenance services to clients.

For simple locally developed stationery motorized prototypes (threshers, hullers, mills, graters, etc) there are a number of formal and informal workshops able to fabricate these for sale to farmers. There are also several establishments mandated to carry out prototype development and outreach as well as training on various aspects of agricultural mechanization. On the next page are examples of the above institutions.

⁴ **Editors' Note:** Uganda is not alone in this situation. Three decades ago the governments of Turkey and Egypt were facing a similar problem – too many different makes and models of tractors for countries with limitations on the capacity to train specialist mechanics and also to carry a sufficient range of spares. Both countries imposed restrictions on the number of tractor makes and models that could be imported. Under liberalized economies such steps are less common, but the “limitation principle” could be interesting for banks financing tractor purchases. Both investors and their financiers stand to benefit from this policy

Main mechanization firms/institutions in Uganda

Name of firm/workshop	Address	Main function
Farm Engineering Industries Ltd (FEIL)	6th Street, Industrial Area, P. O. Box 27400 Kampala Tel: 0414 340 640/1 Email: admin@feilug.com	Importers of new tractors, their implements and spares. Also manufactures HD tractor trailers, besides handling other agric equipments & input. Imports from India/Brazil/Argentina.
Engineering Solutions Uganda Ltd	5th Street, Kampala P. O. Box 25349, Kampala	Importers of new and second hand tractors, implements and spares. They also carry out tractor maintenance and repairs.
Uganda Heavy Duty and Farm Equipment	Kawempe P. O. Box 22005 Kampala.	Imports second hand tractors their implements and spares, and provides maintenance and repairs for the same
China Huangpai Food Machinery (U) Ltd	P. O. Box 24532 Kampala, Tel: 267-772621223. Email: huangpai@utlonline.co.ug	Importers of Power Tillers of various ranges from “Hebei Machinery Import and Export Machinery Co Ltd of China”.
Shuka Group of Companies and Investment (U) Ltd,	Plot 165 Kawempe, Tel: 0414568778 Kampala	Power Tillers and four-wheeled tractors and implements of various ranges from “Ashtad Iran Manufacturing Company”.
Siam Kubota Industry Company Ltd, Thailand	Kawempe, Kampala	MAAIF/NAADS imported two models of power tillers for demonstration to farmers in Uganda.
Agricultural Eng and Applied Technology Research Centre	Tel 041 566 161Kampala Email: aeatri@yahoo.com	Research and Development of a range of agric production & processing equipment.
Busitema University, formally National College for Agricultural Mechanization	P. O. Box 236, Tororo Tel: 0454 448 838 Email: wrodogola@yahoo.com	Trains engineers and technicians in Agricultural Mechanization and Irrigation.
Soroti Agricultural Implements and Machinery Manufacturing Company (SAIMMCO)	P. O. Box 280 Soroti, Uganda Tel: 0752 793 171	Manufacturers (on order) of animal drawn implements: ploughs, planters, weeders and crop processing equipment.
Kampala	Various	There are many firms in Kampala and other towns in Uganda that import a variety of draft animal implements.

2.3 Investments In Water Access, Storage and Irrigation ¹



Introduction

Livelihoods and economic activities in rural Uganda are highly vulnerable to climatic fluctuations in space and time. The droughts in recent times have highlighted the risks to human beings and livestock, which occur when rains falter or fail².

With the recent variation in rainfall patterns, extremely wet seasons have been experienced in certain areas, and are often associated with heavy surface runoff and floods. Late rains have also been reported, introducing considerable uncertainty in agricultural practices.

Under these circumstances, the rural poor are often the most vulnerable. Irrigation may seem the most obvious response to drought. However, it requires a high initial investment and also needs a water source, so it may be difficult in regions that experience on-going water-scarcity.

“Rainwater harvesting and storage” as a concept is used very little in Uganda, and this applies especially

to smallholders who would ideally benefit from its applications. Runoff from rains is often left to cause flooding and soil erosion, instead of being harvested and utilized for domestic use and agricultural production. In the semi-arid drought-prone regions worldwide where it is already practised, rain water harvesting is a directly productive form of soil and water conservation. Both the yield and reliability of production have been significantly improved with this method, more so with the application of practices that encourage efficient water use.

The objective of this article is to highlight the opportunities available for growth in agricultural enterprises, through enhancement of crop and livestock production using improved and affordable technologies to access water, harvest/store water, and better manage this limited resource. Water use in Uganda is controlled, and it is vital that both potential irrigators and their lending banks (or other financiers) are acquainted with the permits required – as set out below in the section entitled **Water Access**.

¹ Author: John Ssemakula, Balton (Uganda) Ltd.

² It is understood that MAAIF is currently (March 2010) preparing a policy paper on water management and irrigation in Uganda.

Irrigation in Uganda: Demand and Benefits

Agricultural production in Uganda is governed, to a large extent, by regional differences in geography and ecology. These differences are described in the classification of farming systems in Uganda by the Ministry of Agriculture, Animal Industry and Fisheries (1995) (Figure 1). In this classification, seven agro-ecological zones (AEZ) are described (Table 1) that vary in rainfall characteristics. The rainfall pattern in AEZ 1 (Banana/Coffee System) is bimodal, usually with a relatively even distribution over the whole year (Fig. 2). Water shortage for both agriculture and domestic use here is, therefore, not acute. Irrigation and water harvesting practice is thus not widely used in this zone.

While the rainfall pattern in AEZ 2 (Banana/Millet/Cotton System) and AEZ 3 (Montane System) may also be classified as bimodal, precipitation in this zone is less evenly distributed over the whole year. The long dry seasons experienced in AEZ 2 (December-February) and AEZ 3 (June-August) are more pronounced than in AEZ 1. These dry seasons are usually characterized by acute water

shortage for both agriculture and domestic use, making irrigation and water harvesting practices more widely required in these zones. *In situ* water harvesting/conservation practices are also more widely used in AEZ 3, due to steep slopes.

The rainfall pattern in AEZ 4 (Teso systems) is bimodal but less pronounced, merging almost into one rainy season. The long dry season (November-March) is more pronounced and characterized by acute water shortage. The area is also a cattle keeping area. Rain water harvesting and paddy rice irrigation (due to flat terrain) are widely practised.

The rainfall pattern in AEZ 5 (Northern System) (Fig. 3) is bimodal but less pronounced, merging almost into one rainy season and a long, pronounced dry season from December to March when water shortage is acute. Here there is only one growing season and limited cattle keeping. However, rain water harvesting and irrigation technologies are not widely practised, although they would be appropriate if vegetables/short term horticultural crops were to be established.

Figure 1. Map showing agricultural systems of Uganda

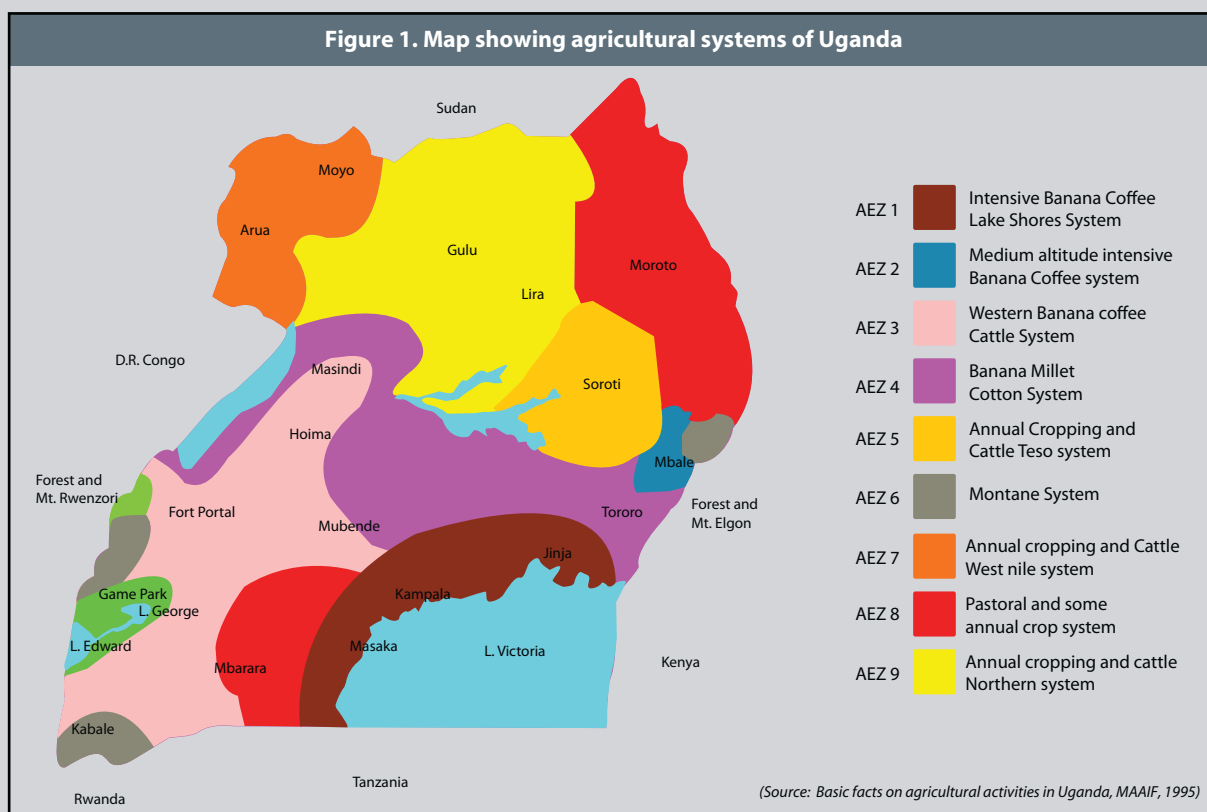


Figure 2. Rainfall characteristics for select agro-ecological zones in Central, Eastern and Western Uganda. A. Kampala (AEZ 1), B. Masindi (AEZ 2), C. Kabale (AEZ 3) and D. Soroti (AEZ 4).

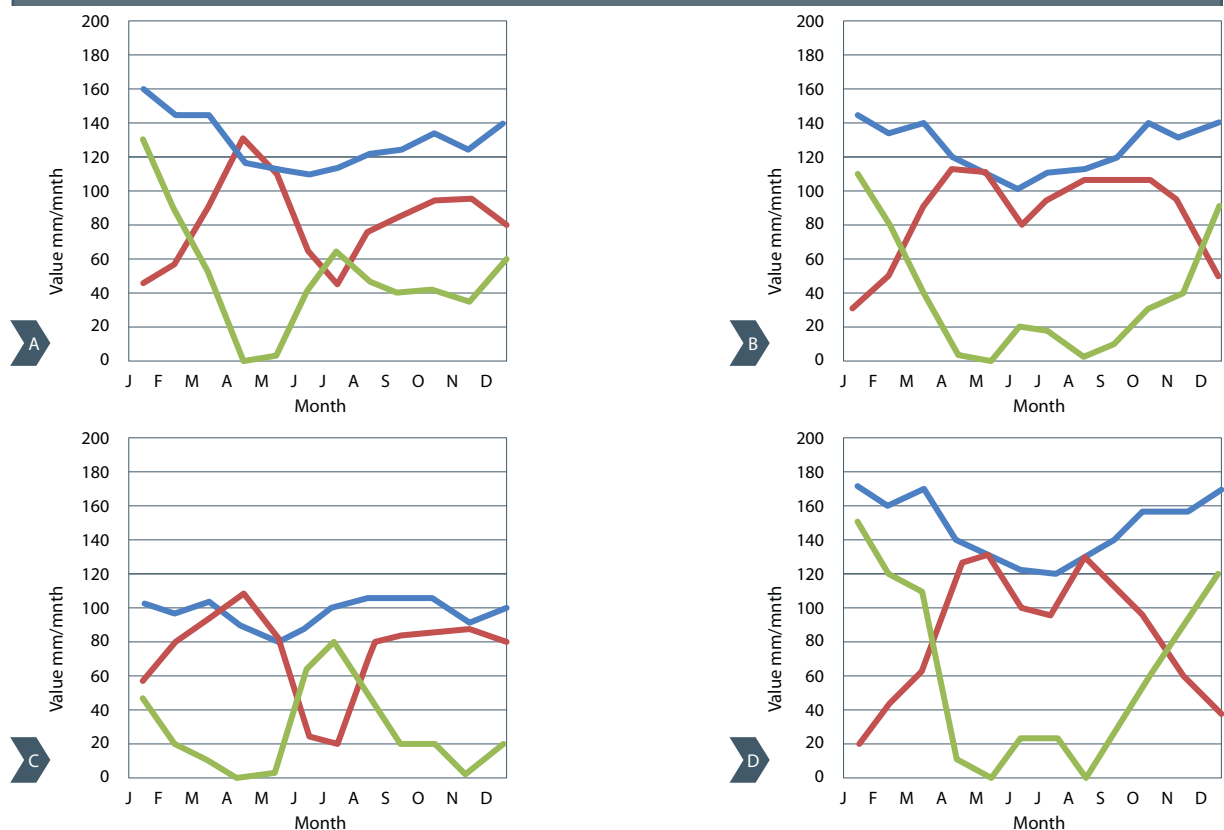
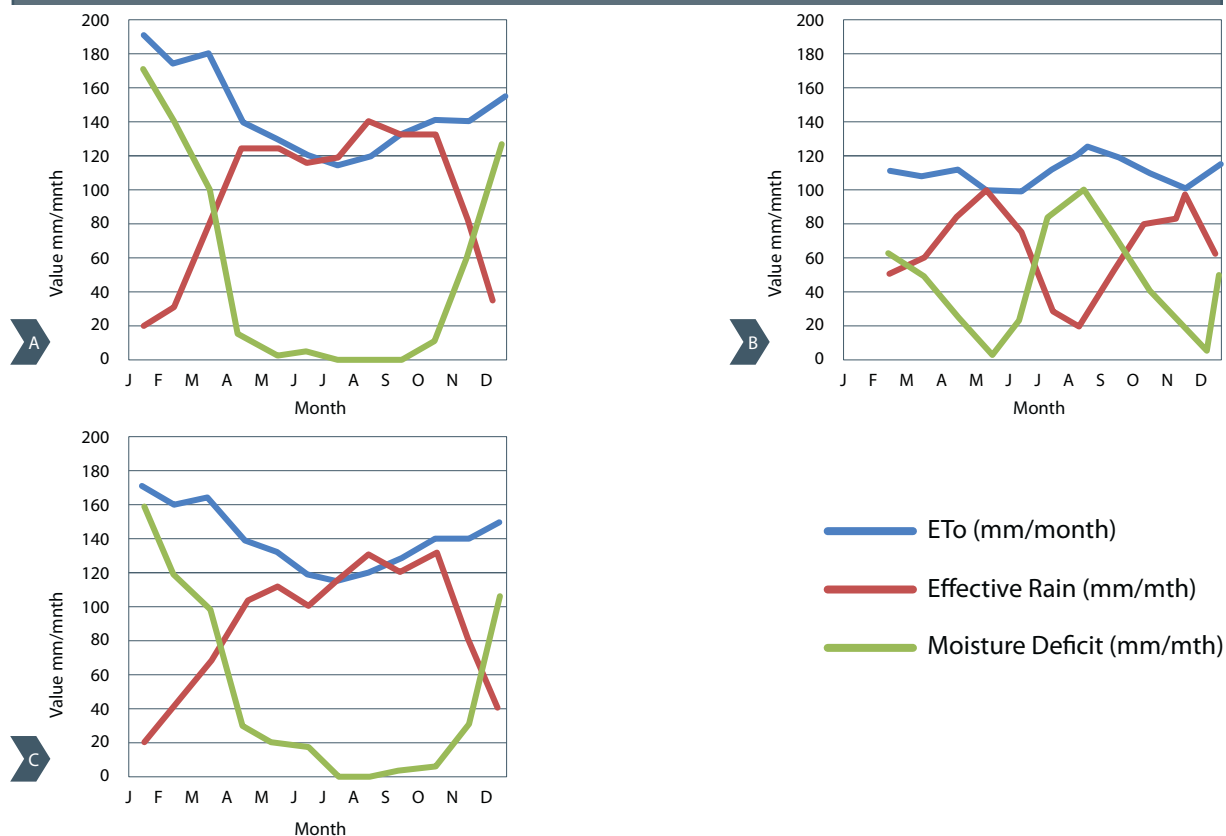


Figure 3. Rainfall characteristics for select agro-ecological zones in Northern and Western Uganda. A. Gulu (AEZ 5), B. Mbarara (AEZ 6) and C. Arua (AEZ 7).



Turning to Figure 3, rainfall in AEZ 6 (Pastoral System) is bimodal but less evenly distributed over the whole year. The dry season experienced between June and August is more pronounced than in AEZ 1 and is characterized by acute water shortage for both agriculture and domestic use. This is a pastoral area and therefore rain water harvesting for both

animals and domestic use is widely practised. The rainfall pattern in AEZ 7 (West Nile System) is similar to the Northern System. Likewise, there is one growing season and cattle-keeping is limited. Rain water harvesting and irrigation technologies are not widely practised.

Table 1. Description of farming systems, rain water harvesting and irrigation in Uganda

Farming system	Description	Districts	Practice of RWH and Irrigation
1. Banana/Coffee System	- Rainfall is evenly distributed (1000 - 1500 mm) - Soils of medium to high productivity - Banana and coffee are the main cash crops. Maize and sweet potatoes are secondary food to bananas - Vegetation is mainly forest-savannah mosaic	Bundibugyo, parts of Hoima, Kabarole, Mbarara, Bushenyi, Mubende, Luweero, Mukono, Masaka, Iganga, Jinja, Kalangala, Mpigi and Kampala	Relatively little rainwater harvesting (RWH), valley tanks/dams, supplemental irrigation
2. Banana/Millet/Cotton System	- Rainfall is less stable than for the banana/coffee system - There is greater reliance on annual food crops (millet, sorghum and maize) - In the drier areas, livestock farming is main activity - Vegetation is moist savannah with moderate biomass production	Kamuli, Pallisa, Tororo, parts of Masindi and Luweero	Relatively little RWH, valley tanks/dams, supplemental irrigation, paddy rice
3. Montane System	- Elevations between 1 500 - 1 750 m above sea level - Rainfall; High and effective cloud cover - Crops: Banana, sweet potatoes, cassava; Irish potatoes Arabica coffee, wheat and barley above 1 600 m - High population intensity and intensive agriculture, small holdings of about 1.5 hectares	Kabale, Kisoro, parts of Rukungiri, Bushenyi, Kasese, Kabarole, Bundibugyo, Mbarara, Mbale and Kapchorwa	<i>In situ</i> RWH, terraces, conservation structures, contour bunds
4. Teso systems	- Bimodal rainfall. The dry season is longer, from December to March - Soils: sandy-loams of medium to low fertility. - The vegetation is moist; grass savannas, short grassland which is ideal for grazing. - Crop: millet, maize, sorghum; groundnuts, simsim, sunflower, cotton - Mixed agriculture (crops and livestock). Cultivation by oxen. The average farm size is about 3 hectares	Soroti, Kumi, Kaberamaido	Paddy rice, valley tank/dam, supplemental irrigation
5. Northern System	- Rainfall: less pronouncedly bimodal, about 1200 mm annually - Crops: finger millet (Eleusine coracana), simsim, cassava, sorghum, tobacco and cotton - Vegetation: short grassland	Gulu, Lira, Apac, Kitgum	Supplemental irrigation, limited RWH
6. Pastoral System	- Annual rainfall is low (less than 1000mm) - Vegetation: short grassland where pastoralism prevails with nomadic extensive grazing - Mixed herds are common but with no sound information on cattle:small ruminant ratios for optimum grassland use	Kotido, Moroto, parts of Mbarara, Ntungamo, Masaka, Ntungamo, Masaka and Rakai	High practice of Valley dams/ tanks, roof water harvesting , supplemental irrigation
7. West Nile System	- Rainfall; pattern resembles that of the northern system, with more rain at higher altitudes. Sub-humid zone - Mixed cropping is common with a wide variety of crops - Vegetation community is moist grassland. Livestock activities are limited by the presence of tsetse fly - Crops: finger millet, simsim, cassava, sorghum tobacco and cotton	Moyo, Arua and Nebbi	Supplemental irrigation, limited RWH

(Source: Basic facts on agricultural activities in Uganda, MAAIF, 1995)



Water access

The Government of Uganda has a comprehensive policy and legal framework for the management of the water sector. In the Water Statute (1995), besides general rights to use water for domestic purposes, fire-fighting, subsistence garden irrigation, there is no authorized allocation of permanent water rights, but rather provision for the issuance of time-bound permits to abstract water, to construct hydraulic works and to discharge waste. The objective is to ensure that the use of water resources is environmentally friendly and promotes sustainable development. These controls also ensure that water is not treated as a free good, but as a good with a value to be paid.

The different types of permits provided for under the regulations include: (i) **Surface water abstraction permit**, (ii) **Ground water abstraction permit**, (iii) **Drilling permit - for persons involved in drilling of boreholes**, (iv) **Construction permit - for a person who wishes to engage a driller** to construct a borehole on his land for the purpose of using water or recharging an aquifer or fitting a

motorized pump or borehole. The same permit is also given for impounding, damming, diverting or conveying any surface water and or draining any lands.

Any allocation of water for commercial purposes without a water permit issued by the Directorate of Water Development (DWD) is prohibited. The Water Statute, 1995 does not exempt water use for agricultural production from the requirement of a permit. In addition, the water resources regulations of 1998 require that an extraction of water from a borehole or waterway, weir, dam, tank or any other work capable of diverting an inflow of more than 400 cubic meters of water in any period of 24 hours is subject to the requirement of a permit by DWD.

Water pumps

Water pumps require an energy source to supply water under pressure to the irrigation system. This energy source may be in the form of manual human labour, hydraulic or fuel engines, electric motors or renewable energy from wind mills or solar power. The type, as well as the efficiency of the pumping

unit determines the cost of energy/fuel and the rate of discharge and pressure. Irrigation pumps can be mounted on the ground surface or submerged in the water source. The choice of type is determined by the pump suction lift. Ground surface pumps are limited by the suction lift and are therefore more suitable for surface water sources. Submersible pumps on the other hand are installed in the water source for a positive lift of water from deep wells/ water sources. The most cost-effective pumping system should be selected for irrigation, which does not always mean the cheapest system, since low

initial cost may sometimes result in high running costs including time, energy, repair/maintenance, operation/maintenance skills and vulnerability to theft.

Water storage

Water for agricultural production in Uganda is accessed using a variety of technologies (Table 3) from *in-situ* storage to valley dams and reservoirs. These technologies exhibit a range of characteristics with respect to cost, maintenance and water use efficiency.

Table 2. Description of water storage technology available for agricultural production in Uganda

Water storage technology	Maintenance/ Management	Cost	Repair parts availability	Water use efficiency
Valley dam	Fairly difficult	High \$100,000 -200,000	Local materials	Average (High ET & seepage losses)
Valley tank	Fairly easy	Moderately high \$20,000 -100,000	Local materials	Average (High ET & seepage losses)
Pots & jars	Easy	Low \$85 - 160	Local materials/Towns	High (low evaporation losses)
Plastic / Corrugated galvanized tanks	Easy	Average Up to \$3,500	Town centres	High (low evaporation losses)
Ferro cement tanks	Easy	Fair \$300-1,000	Local materials/ Towns	High
Brick masonry tanks	Good	Fair \$300-1,200	Local materials/ Towns	High (low evaporation losses)
Subsurface masonry tanks	Fairly easy	Fair \$300-1,700	Local materials/ Towns	High (low evaporation losses)
In-field ponds and canals	Good	Cheap Farm labour	Local	High
HDPE/Polythene lined reservoirs	Minimal	Beyond 24000lts capacity, it is cheaper than prefabricated plastic tanks	Requires specialised tools from supplier	(low evaporation losses) High (No seepage losses & evaporation can be reduced by covering)
ET = Evapo-Transpiration				

Irrigation: Methods, comparisons and maintenance

In **flood / furrow irrigation**, water is pumped or brought to the fields and is allowed to flow along the ground among the crops (Fig. 4A). This method is simple and cheap, costing less in terms of equipment. It is, however, labour intensive in leveling, opening canals and has proved to be an inefficient water use practice for crop production in this time of dwindling/scarce water resources since about half of the water used does not get to the

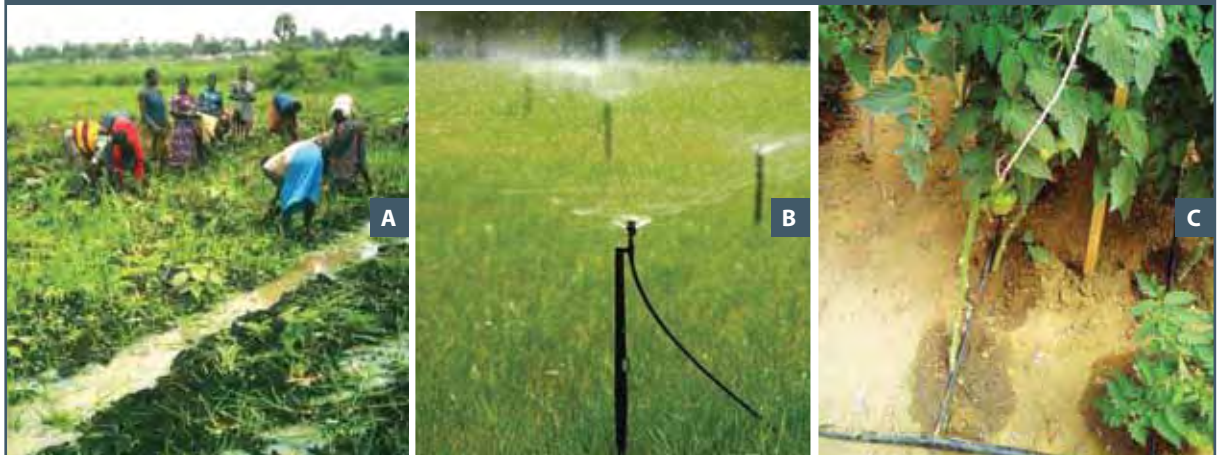
crops. Traditional flood irrigation can mean a lot of wasted water, while weeds, just as much as crops, benefit from the irrigation.

Sprinkler irrigation is a high pressure and high flow irrigation system where water is pumped and distributed through laterals and sprinklers (Fig. 4B). This system is ideal for topography that is level to rolling and applicable to all field and horticultural



crops with the exception of trees. It utilizes water from streams, reservoirs/wells. Salt water may, however, be harmful to plants. Evaporation, erosion and runoff, are moderate to high, and weeds are a major problem. Labour and capital investment required for this system is low to high, with some management skill being essential. The duration of use registered with sprinkler irrigation systems is medium to long term. The energy requirement is moderate to high, with high pressure of >30psi required. Some interference is experienced in the operation of machinery. Distribution of water is uneven in windy conditions and system automation is neither easy nor cheap. Nevertheless, chemical application is good.

Figure 4 A. Flood Irrigation; B. Sprinkler system for vegetables/field crops; C. Dripline irrigation. Dripline in Alternate crops with one dripline irrigating two rows



Drip/micro irrigation is the frequent, slow and even application of water at low pressure over longer time periods directly to the root zones of plants (Fig. 4C). Conveyance of water and sometimes fertilizers to the field is through plastic pipes with emitters that are laid along the rows of crops.

Drip/micro irrigation is ideal for any landscape and is often used in the irrigation of high-value crops, fruit trees, cereals and vegetables. This method utilizes all types of water, including city water and high salt waters, as long as the quality is sufficiently good to avoid clogging of emitters. Drip irrigation exhibits higher water use efficiency (80-95%) than flood (50-60%) and sprinkler (75-80%) systems. It is therefore quite profitable where water supplies are scarce and expensive since there is minimum loss by leaching and evaporation. Weeds are not a problem with this method of irrigation and neither is runoff or erosion.

The initial cost, per acre, of any irrigation system is usually high though there are designs that may minimize costs and be more easily adaptable since they provide the option of a portable or semi portable irrigation setup. In such designs a farmer can use a set of irrigation equipment for say a quarter an acre (Table 3) to irrigate a bigger area e.g. half an acre, depending on the irrigation scheduling, availability of water and labour.

Successful irrigation and efficient water use is achieved through system maintenance and optimal scheduling of irrigation in relation to crop-water requirements, soil properties, water supply constraints and irrigation system characteristics. System maintenance is more meaningful with a well planned system since proper planning ensures that after-sales service will be trouble free with availability of system parts and technical assistance. Proper operation and maintenance of irrigation systems facilitates optimal utilization of the system, as well as efficient water and energy usage.

Table 3. Typical cost for smallholder gravity drip system for 0.5 acre (35m x 29m x 2) at 1m lateral spacing*

Description of goods	Quantity	Unit price (US\$)	Total (US\$)
Plastic angle seat valve 1.5"	1	28.00	28.00
1.5" filter 120mesh	1	34.00	34.00
Plasson socket 1.5"	1	2.80	2.80
Plasson elbow female 50*1.5"	1	15.00	15.00
Plasson elbow 50mm	1	17.00	17.00
Pe irrigation pipe 50mm	50	3.23	161.62
Pe x drip connector	70	0.78	54.54
Dripline 1250m	1	310.00	310.00
Line end 50mm	2	16.00	32.00
16mm line end	70	0.23	16.10
Accessories	1	25.00	25.00
Sub Total			696.06
VAT			125.29
Total			821.35

*The cost refers to two adjacent blocks, each 0.25acre, sharing the same system by mirroring/shifting the infield setup and does not include the cost of the Barrel/tank, 2m stand and the filling of the tank

Energy and initial capital requirements are generally low, with the former standing at a pressure of 5-15 psi. Similarly the labour requirement may be low but also necessitate some level of training, especially in system management. Drip irrigation has long term duration of use and is easy to automate. Even distribution of water is registered under all weather conditions. Fertigation/chemical application is also very good though considerable interference is registered in the operation of machinery.

The maintenance routine considers the following components of the system: (i) Water source, (ii) Pumping unit, (iii) Filtration, (iv) Supply pipeline/canals, (v) Control heads, (vi) Mains and sub-mains/canals, (vii) Manifolds, (viii) Laterals, (ix) Risers, (x) Emitters (sprinklers & drippers) and (x) Accessories (valves, check valves, air valves, couplers, pressure and flow regulators, fertigation devices).



System maintenance is divided into two major categories: **Preventive maintenance and Corrective maintenance.**

Preventive maintenance is the most cost effective and should be the most practised maintenance to keep the system in good working condition and in service for a long period. On the other hand, inadequate preventive maintenance actually costs more over the design lifetime of a project by unnecessarily absorbing scarce capital and also leads to production losses.

Many irrigation schemes may fail prematurely due to inadequate maintenance and a large part of the investment in irrigation goes to rehabilitating schemes which could have been performing at a higher efficiency for the want of a relatively modest investment in proper maintenance.

It is therefore important to equip the beneficiaries of irrigation systems through participatory involvement during the planning, installation and management with knowledge of the components making up an irrigation system so they understand their importance, location and operation principles, trouble shooting techniques, failure indicators and preventive maintenance of the systems.

Sources of expertise on irrigation in Uganda

In Uganda, expertise on the various aspects of irrigation mentioned above is provided by a number of commercial firms, as well as by MAAIF and universities such as Busitema and Makerere.

The commercial firm, Balton (U) Ltd can provide complete turnkey irrigation solutions including design, materials supply, installation/implementation, capacity building and after sales services for irrigation scheme beneficiaries. Its clients range from very small to large-scale farmers.

Private-Sector Institutions:

1. Balton (U) Ltd
47/51 Mulwana Road
Industrial Area, Kampala
Tel: 0757 255852
Email: irrig@balton.co.ug
2. Agromax (Uganda) Limited
Gayaza Road Kampala
Email: ronyjoy@agromaxu.com
Tel: 0756 622464

The two companies mentioned below also provide water pumps used for irrigation:

3. Davis & Shirtliff Ltd
P.O. BOX 22824, Kampala, Uganda
Kitgum House
TEL: +256(0)414 346337/8
4. JOBAK Engineering Contractors Ltd
P.O. BOX 35916 Kampala
Plot 136, 6th street, Industrial Area
TEL: +256(0)312 112006

Government Institutions:

1. Ministry of Agriculture, Animal Industry and Fisheries,
P.O. Box 102, Entebbe
2. National Agricultural Research Organization,
P.O. Box 295, Entebbe

Affiliated Institutions:

- a. National Agricultural Advisory Services (NAADS)
 - b. Agricultural Engineering Training and Research Institute - Namalere
 - c. National Crops Resources Research Institute - Namulonge
 - d. National Agricultural Research Laboratories Institute – Kawanda
3. Ministry of Water and Environment
P.O. Box 20026, Kampala

Academic Institutions:

1. Department of Agricultural Engineering,
Makerere University, P.O. Box 7062, Kampala
2. Department of Agricultural Mechanization and Irrigation Engineering,
Busitema University
P.O. Box 236 Tororo

2.4 Trends in Seasonal Input Financing and Use in Uganda: The Supplier's Perspective ¹



Brief History of the Agro-inputs Sub-sector in Uganda

Until 1999, all matters to do with securing, planning and distribution of farm inputs were in the hands of the cooperative or the public sector. With regard to seeds, we had the Uganda Seed Project. For agrochemicals, government or government working with some of its parastatals such as UDC and/or national cooperatives made procurement tenders that were largely for the big plantation and estate crops like sugarcane, tea, cotton (widespread smallholder cash croppers) and the like. The only other two channels of improved farm inputs distribution were through the efforts of donor programmes (mainly Danish vegetable seeds and Japanese KR 2 pesticides project) and “the general trade” - smuggling from Kenyan and Rwandan inputs distribution programmes.

Thus the inputs scenario in the pre-liberation era was very closely restricted, and this lasted a long time – virtually the whole period from the Borup days (1902 to 1999)². Uganda had no private sector investments in either importation or local

production/distribution of inputs to farmers. Government policies to support such private endeavours were non-existent. Inputs distribution was a preserve of cooperatives, farmers’ associations, district production department offices, churches and civil society organizations. With time came the realization that these kinds of efforts would never offer a sustainable framework for inputs supply.

With suitable policies during the post-liberalization era, coupled with the requisite guidelines to enforce the regulations and carry out inspection for compliance to the law, private sector and commercial distribution efforts came into play. Investments driven by profit and policy reviews that respond to a greater need for quality assurance are now the order of the day.

The quantities, range and types of inputs and the supplier’s numbers have greatly increased every year. The private sector has been able to see a business opportunity in the relationship that exists between demand and supply of these inputs. The adoption rates of inputs by Ugandan farmers are ever on the increase. A potent stimulant to enhanced

¹ **Author:** Thembo-Mwesigwa Wilfred, Uganda National Agro-Inputs Dealers Association

² Cotton was first introduced into Uganda by K. Borup, an industrial missionary, who in 1903 distributed 62 bags of cotton seeds for planting.

usage and county-wide commercialization of the inputs has been the emergence of good markets for hitherto non-traditional crops, namely maize, soybeans, horticulture/floriculture, sorghums, oilseed crops, sesame etc. The other stimulants are the increased number of mouths to feed nationally and the scale of urbanization.

The primary inputs covered in this article are seeds, fertilizers, pesticides, veterinary drugs and vaccines, feeds, and some farm equipment and machinery. With the liberalization policy, there are now (end of 2009) 21 private companies in the seed sub-sector and 16 importers and distributors of agrochemicals (fertilizers and pesticides). On the livestock input supply side there are hundreds of animal feed formulators and suppliers and between 15 and 20 reliable animal health products suppliers.

Access and Affordability

The status and development of input delivery mechanisms and networks in Uganda are two interesting issues. Inputs delivery in Uganda is now largely commercial and solely in the hands of privately-owned dealerships.

The development of private-sector input delivery mechanisms has been a combination of efforts of donors and development programmes such as DANIDA, DFID and USAID/ IDEA project, Sasakawa Global 2000 "One Stop Centers" programme and agro-dealer network strengthening projects by UNADA.

Government has also played a major role in as far as putting in place the necessary regulatory frameworks is concerned. Other input distribution mechanisms at play in Uganda are the Voucher-for-Work programmes in West Nile and Northern Uganda where the mobilized or self-selected members of the public offer physical labour in exchange for the voucher value's worth of inputs. Input loans (especially seed) are also in place. An example is the NAADS' Integrated Support to Farmer Groups Programme. The inputs are priced at real market value.

Affordability has a direct bearing on the categories of inputs that will be in demand in the future. For example, the main Ugandan seeds market is for improved, open pollinated varieties (OPVs) of crop seeds because they are lower cost than hybrid varieties, and moreover farmers can recycle the seed for the next season. These improved OPVs can yield

favorably with the use of associated inputs such as fertilizers. In addition, for crops like maize, the OPVs can withstand the stresses of major diseases such as Maize Streak Virus, Grey Leaf spots and Northern Leaf blights.

There are few farmers for whom it makes sense to apply expensive pesticides on such crops as sorghum, maize, groundnuts, beans etc. In general there is minimal usage of high-yielding seed-fertilizer combinations because of limited basic extension knowledge and the non-availability of fertilizers. Nevertheless, it is widely recognized that modern farming, high yields and substantial profits require significant investment in improved inputs – seeds and agro-chemicals.

For example, a Ugandan farmer needs four acres of cultivation under a crop in order to match the same output as one acre of the same crop in the developed world. In the Gender Disaggregated Data for Agriculture survey of 2009 it was revealed that most Ugandan farmers do not use improved agricultural inputs. In more detail, 75.5 percent do not use improved seeds in general while 85 percent do not use hybrid seeds. Again, 93.1 percent do not use herbicides and 83.4 percent do not use pesticides. On the livestock side, 94.5 percent do not use improved animal feeds and 75.2 percent do not use veterinary drugs.

In the same survey, 34 percent of farmers cited lack of knowledge about improved seeds as the reason they did not use them, 29.2 percent said that the improved seeds were expensive, 30 percent said that the seeds were unavailable, 43 percent said they lacked knowledge about hybrid seeds, while 30.2 percent said that the seeds were too expensive and 28.2 percent responded that they had no access to hybrid seed.

Demand Side Analysis

Inputs supply is characterized by seasonal demand trends for inputs by farmer type and farming enterprises i.e. smallholder farmer vs. an estate farmer and annual vs. perennial crops.

Spatial and geographical demand trends across the country are observed. Eastern Uganda demands the highest level of seed and associated inputs for cereal crops. The central region leads in the consistent demand for inputs relating to horticulture/floriculture. The western region leads in the demand for inputs linked to estate crops of sugarcane, tea and some coffee.



Reasons for the relatively low demand for inputs include:

- a) high cost,
- b) anti-input lobbyist views about using improved seeds, pesticides, fertilizers, and feeds vis-à-vis environmental concerns,
- c) availability of a multiplicity of staple food alternatives,
- d) poor road networks,
- e) limited or lack of markets for the outputs and
- f) long distances farmers have to trek to the nearest stockist.

Supply Side Analysis: An efficient inputs distribution regime should consist of:

- a) Reliable time lines of deliveries of the inputs: - infrastructure and transportation networks that ensure that inputs are available everywhere just prior to the planting season;
- b) Warehousing and storage facilities for inputs at agro-dealerships close to the farming public;
- c) Geographical dispersion of supply points and the agro-dealers network, especially in the countryside beyond urban centers and tarmac roads;
- d) Product knowledge base in the countryside that conveniently reaches farmers. The public extension service coverage of a paltry 7 percent nationally calls for supplementary efforts from the private sector;

e) Suitable range, volume and quality of the inputs vis-à-vis the pack sizes available on the market; in fact the Uganda inputs market is efficient here. The inputs range is rich; the volumes are fair especially in major towns and small/single use pack sizes can be supplied now in seed and pesticides trade. These factors combine to enhance affordability and usage ³.

Finance for Inputs Trading and Input Utilization

Financing the trade in agro-inputs and in general agricultural finance for inputs usage are largely matters of private savings, family assistance and/or loans expensively acquired from commercial banks at interest rates typically in excess of 23 percent per annum.

Collateral requirements in the form of prime real estate complicate obtaining loans from banks. There are no large scale government subsidies in place. Working capital restrictions explain why the average stock value for agro-input dealers is only UGX 0.5m. There are some 2065 agro-input dealers countrywide. These are restricted to urban centers and sites alongside main tarmac roads. Farmers therefore not only have to finance the cost of the inputs, but also the costs relating to actual access.

From UNADA's point of view, the access farmers have to loans for input purchase is very restricted. Despite many farmer groups, there are few working contract farming arrangements that would facilitate access to and the financing of inputs.

Policy environment

a) A situational analysis of the current inputs environment reveals three major frameworks/laws. The Seed Act, the Agrochemicals Control Act and the National Drug Authority (NDA) Act for drugs, vaccines and animal feeds.

b) Public awareness about the three legal regimes, at least with the input suppliers, is very limited. The enabling guiding regulations to the Acts are not seen or are not in place; this limits the supportive effect of regulation and compliance to the law.

c) Government is constrained resource wise – in terms of offices and facilities to deploy effectively for quality assurance countrywide. There is a marked contrast here between one regulator (the National Drugs Authority) and the other, MAAIF, with the former being significantly better funded for its role.

d) There is a dire need for policy reviews aimed at up-scaling the level/numbers of official licensees, and strengthening inspectorate services on the one hand, and improving the availability and affordability of agricultural finance, together with output markets on the other. These measures will be a motivator for greater investing in the purchase of more inputs across agricultural zones and seasons.

Conclusion

Promoting input use by farmers in Uganda will require a comprehensive market-oriented approach that considers the full range of factors including:

- quality assurance of seeds, veterinary drugs and agro-chemicals,
- finance for agro-input stockists and for their farmer clients,
- market outlets,
- effective agricultural research and extension systems,
- supportive policy formulation and delivery.

³ **Editors' Note:** The actual scenario may not in fact be so positive. There are many reliable reports of sub-standard inputs being sold, and with a poorly-educated farming population, this is a serious issue, requiring whatever protection the public sector can provide.



Chapter Three
***Marketing and
Processing
Investments***

3.1 Investment in Quality Enhancement for Market Produce ¹



Introduction

This article explores the need for value chain finance with particular regard to enhancing the quality of food products sold in urban markets in Uganda.

We start by describing some of the major supply food chains, namely for some important staple foods, fresh fruits and vegetables, livestock and fish. We then describe some challenges and constraints that affect the quality of the food products as they move along the supply chains. We briefly bring organic farming in the context of improving quality, and finally we make some recommendations for providers of finance for financing these supply chains with respect to maintaining quality, enhancing shelf life, and adding value.

Supply Food Chains For Market Produce Sold In Urban Areas

Staple Foods: Bananas, Potatoes, Cassava And Maize

In Uganda, bananas, potatoes, cassava and maize are very important staple food items. For the production areas of central, western and southern Uganda, the focal destinations of the staple food items are the Kampala markets (Owino, Nakawa, Kalerwe, Nateete and others). Food items from Mbale and Kapchorwa generally go to Mbale main market first. Although there are travelling traders who may directly supply other towns and urban centres, Kampala is the main wholesale market for traders from other towns such as Entebbe, Mukono, Kayunga, etc. Mbale market is the main distribution centre for Tororo, Iganga, Pallisa, Kumi and Soroti urban markets.

A sizeable portion of local output is consumed by farmers from own production and by buying from neighbours and village markets. To avoid losses caused by the perishability of the crops, farmers

¹ **Author:** Morrison Rwakakamba, formerly Uganda National Farmers Federation

harvest only when they have a buyer. At the time of sale, the farmer and village trader/broker agree on activities such as harvest date, sorting and packing. In most cases it is the farmer who harvests the crops while village trader/broker provides the packing bags and does the packing. Most of the produce is sold at farm-gate and on a cash basis. Other than selling to village assemblers and brokers, farmers also sell their crops by the roadside, take them to the weekly village markets or sell them to the village retailer.

Fresh Fruits and Vegetables Supply Chains

The fruits and vegetable sector in Uganda is highly varied: avocado, mangoes, citrus fruits, pineapples, tomatoes, cabbages, spinach, green salad, apples, locally popular greens (such as 'dodo', 'nakati', 'nsugga'), and so on. The large bulk of these commodities is grown and consumed on the same smallholdings. However, an important component, also grown on small farms, is transacted in markets destined for consumption or processing within Uganda or for export within the East Africa region and beyond.

The demand for fresh fruits and vegetables is increasing as the urban and peri-urban population grows and diversifies, both in terms of income distribution and ethnicity. A large portion of fruit and vegetable sales takes place via small transactions involving lower and middle income consumers. For example, Mukungwe sub-county in Masaka district is becoming famous for specializing in producing fresh fruits and vegetables. Many homesteads are earning a minimum of UGX 3,000 daily income from middlemen who go around collecting vegetable items for bulking. Alternatively, the farmers sell off their produce on market days when several trucks come to the trading centers to collect these items for urban destinations.

However, the market for small-scale producers of fresh fruits and vegetables is threatened by the rise of large supermarkets in Uganda. The robustness of their sourcing, enforcement of quality standards, procurement procedures and high-tech systems stand in sharp contrast with the more fragmented and seemingly unstable traditional labor-intensive value chain described above. Urban dwellers in Uganda are increasingly consuming fruit and vegetable products of attractive appearance, and apparently high quality, imported from countries such as Kenya and South Africa.

Livestock Products

Livestock products on urban markets in Uganda include dairy products, beef, goats' meat, pork, chicken and eggs. Like the other food items described above, most of the livestock products produced in the rural villages find their way to the consumers through similar channels to staple foods. Traders and brokers collect the products for bulk transport and distribution to the urban centers. Some of the livestock products such as roast meat and raw milk are sold in small town centers along highways. However, the largest consumers are urban dwellers.

Some meat is processed into sausages and minced meat products that have to be stored chilled or frozen, until they are sold. Processing of milk results in packed milk, butter and ghee. The culture of eating cheese has not yet been established in the country, and so there is little market for it among indigenous people. Hence the production of cheese and cheese byproducts is still very low volume. Neither has the processing of powdered milk been fully embarked on, despite the frequent surpluses of milk and high demand for powdered milk in schools and other institutions. For instance, the World Food Programme (WFP) imports all the powdered milk it distributes in relief programs.

The fish value chain

The fish supply chain in Uganda can be described as a set of interdependent agents (fishers, processors, and distributors) that work together, in a manner with varying organised structure, to convey a fish derived product to the eventual consumer. The path is usually short with the catch being sold fresh, either from the quayside or beach or in an adjacent market.

The fish chain is extended, however, when curing - smoking, pickling, salting, drying or freezing - is undertaken, although the destination of the final transformed product may remain local. Canning affords additional commercial opportunities and has been carried out by some companies that are largely foreign owned. Dispatch of fish to inland or overseas markets further lengthens the chain.



Challenges In Enhancing Quality In Food Supply Chains In Uganda For Urban Consumption

There are a number of cross-cutting issues that affect food supply chains in Uganda. The factors mentioned below need to be considered in value chain financing for enhancing quality:

- **Small-scale production:** Most of the production takes place on a small scale, e.g. 3-4 acres of crops (or less in peri-urban areas), less than 20 heads of cattle for most farmers (3 or 4 heads of cattle in case of zero-grazing), less than 2,000 birds reared by most poultry farmers, etc. The small scale of production implies that individual farmers cannot easily access wide markets, improved inputs or technologies for improving yields and quality.
- **Seasonality and Uncertainty of Production:** Crops are highly dependent on the seasonality and reliability of the rainy seasons. Dairy production drops down during dry seasons due to scarcity of water. Beef production on the other hand increases during the dry seasons when farmers are forced to sell off their animals cheaply due to lack of feed and water.
- **Lack of awareness and implementation of health standards:** Most producers, traders and consumers in Uganda are not aware of the consumer health standards required of food products. Implementation of these standards is beyond the immediate concern of the key actors in the food chains for urban consumers; this will need addressing if produce is to attract supermarket produce buyers.
- **Crop and livestock thefts:** many rural farmers are discouraged from farming because what they produce is easily stolen. The thieves frequently come from distant areas and are usually hard to identify and deal with. The farmers lack the resources to protect their produce. To avoid the thefts, the farmers are forced to sell off their produce pre-maturely and hence at a lower quality and at lower prices.
- **Weeds, pests, animal and crop diseases:** Despite the fact that Uganda is the second largest producer of bananas in the world, producing over 8.6 million tonnes per annum, (30% of the world's production), unprecedented diseases like the banana bacterial wilt and the black sigatoka disease have been threatening the banana industry for the past five years.

Similarly, mosaic and other diseases have been threatening cassava production. Maize and potato production have also been affected by pests and diseases. Replanting with disease-resistant varieties, as these become available, requires investment.

- **Perishable nature of many food products:** Virtually all the food products need to be consumed or processed as soon as they leave the farm, else they will deteriorate very quickly. Coolers are needed to extend the life of milk, meat, vegetables, fish, etc. Some losses have been incurred by farmers and traders when green bananas go ripe, harvested maize is eaten up by pests and moulds, poorly stored eggs go bad, etc.
- **Domestic vs. international chains:** The supply chains generally comprise two separate chains serving two distinct sectors: international and domestic. There is little crossover between the two in terms of service providers and asset usage such as warehouses. Unlike the international chain counterparts, the domestic chains are characterized by low levels of investment, high transaction costs, poor integration, poor technologies, weak vertical linkages, poor organization, high risks and low profit margins. There is little learning and information sharing between corresponding domestic and international chains.

In general, only very modest benefits are reaped by producers attempting to improve quality for the urban markets in Uganda. The average consumer here is more conscious of price than quality. For instance, mature chicken broilers aged above 4 months and selling over UGX 25,000 each at farm gate price have very limited markets (festival seasons, ceremonies and a few luxury hotels). Instead, most farmers find it more profitable to sell off immature birds 5-6 weeks old because there is significant demand from consumers who are willing to buy and eat less mature chicks of lower quality, paying a lower price than would be the case for a higher quality bird. Some producers resort to various procedures to make the chicks grow fast, including treating them with growth hormones and extra vitamins. This alone bars the chicks from some export markets, where returns could be more attractive.

Investing In Quality Enhancing Techniques

With respect to the challenges and constraints identified above, the approaches and investments described below could play a key role in maintaining and enhancing quality along the supply chains of foodstuffs consumed by urban dwellers in Uganda:

Investments to Address Small-Scale Production Constraints

Increasing finance towards start-up activities among the rural poor could greatly increase the scale of production of the various food commodities. The on-farm investments possible here are many and varied, including: inputs such as seeds, walking tractors, pesticides, drugs for livestock etc. In addition, off-farm (i.e. public sector / donor) assistance is needed in the form of more solid field extension work to ensure increased productivity. Their organizational capacities also need to be enhanced to ensure that farmer groups are formalized, effective and sustainable. Such strengths would enable the farmers to access wider markets, negotiate better terms with traders, and maintain quality of produce for greater competitiveness.

Investments to address Seasonality and Unreliability of Production

The key factor here is rainfall. Overcoming the problems of seasonality and unreliability of rainfall would enable producers to plan production and hence even out shortages and excesses that lead to quality deterioration². In addition, farmers' groups need to be strengthened so that they can provide adequate storage facilities for the various products of their members. Such storage facilities would also even out fluctuations in produce entering the market.

Increasing Awareness and Implementation of Food Health Standards

Educating the farmers and general public about food health standards is required to create more sensitivity towards quality. Again, this is a public sector responsibility, but can also convey direct benefits, apart from healthier food entering the supply chain. As noted above, investments in this area can also open up access to markets where these considerations are important – for example, supermarkets.

Investments to address Crop and Animal Thefts

This is more a matter for community action, than investment per se, though some growers have invested in fences to delineate their gardens and so discourage theft.

Investments to address Weeds, Pests, Animal and Crop Diseases

Here lies an opportunity for financing investments in provision of herbicides, pesticides, animal vaccines and drugs. Research also needs to be supported. There are already many varieties of improved materials that are resistant to weeds,

² **Editors' Note:** See Article 2.3 Irrigation, in this edition of the Yearbook.



pests and common diseases. For instance mosaic-resistant cassava and other crops are available from Namulonge and Kawanda research stations.

A case in point is the AgroGenetic Lab Technologies at Buloba, on Fort Portal Road. This station, under Mr. Nsubuga, has specialized in tissue culture technology that produces high quality, disease-free planting materials that are not genetically modified. The station is most famous for laboratory-prepared banana tissue culture plantlets that yield very large bunches of bananas as they are completely disease free. Such plants are of uniform quality and are extremely attractive, especially for the export market. Unfortunately, Mr. Nsubuga has not yet received the much promised support from government, NAADS, or financiers. Instead, 40 percent of his products are purchased by the Rwandan Government, which buys between 400,000 and 500,000 plantlets annually at a cost of UGX 1,500 each.

Investments to address Transient Nature of Products

Investments needed here include cold chains (cool and cold stores, refrigerated trucks, and packaging houses) and value adding processes (such as fruit juice processing and packaging).

Fish Food Chain Quality Challenges

Quality assurance mechanisms are imperative in fisheries given the latent perishability of the product. Although traditional sensory inspection of gill coloration, eye condition, colour, shine and texture of skin/flesh, thickness and colour of the slime on the skin, and smell affords a consumer some indication as to freshness, such inspection is unable to necessarily discern the initial breakdown of various components present in the fish which trigger its subsequent decomposition. Equally, sensory inspection is unlikely to disclose whether the product is contaminated with bio-toxins and heavy metals, residues of veterinary medicines (aquaculture products) etc.

Implications For The Financial Sector

To mitigate the constraints and achieve the foregoing actions, banks must open up to the farming sector, despite its perceived risks. As a big employer (70 percent of the citizenry), agriculture presents an opportunity for dramatically transforming the country if the necessary investments and capital are directed to improving productivity, commercialization and competitiveness. Financial investment areas could include the following:

- Finance for input stockists
- Loans and leases of equipment to agriculture and agro-processing businesses
- Private-public partnership investments in cold chains
- Long-term development loans for large-scale farmers and for investment in infrastructure, especially community access roads and irrigation schemes

In addition, public sector support could be directed to investments in areas such as:

- Zero-tax regime for agricultural inputs such as seeds and machinery
- Funding for investment in farmer group dynamics
- Investment in Business Development Services and putting in place venture capital to operationalise innovations and viable agribusiness ventures

3.2 Coffee Sector Challenges: Growing and Processing Robusta for the Market ¹



Significance Of Coffee In Uganda's Economy

Coffee is still by far Uganda's largest export commodity, contributing around 20 percent of total export earnings. Moreover, up to 1.3 million households, say, seven million people are involved in the coffee subsector.

Uganda has the potential to produce significant volumes of high quality Robusta coffee, with substantial benefits to coffee growers, to others in the coffee value chain, and to the country's economy. However, before the potential can be achieved, much needs to be done to improve quality and increase volumes. This article addresses

some of the challenges with Robusta production, processing and marketing, challenges that must be met before Ugandan Robusta production can realize its full potential.

Given the financial services focus of the Yearbook, the article concentrates particularly on aspects of farmer-level finance and finance of primary level processing, and the contribution improvements here can make to production, quality and incomes.

The dominant position of coffee in Ugandan agriculture is illustrated in Table 1.

¹ Author: Ezra Munyambonera, UCDA

Table 1: Commodity Exports by Value in US dollars for Uganda for 2008 and 2009

Commodity	2007		2008	
	Value ('000) US\$	% Value	Value ('000) US\$	% Value
Coffee	266	44.11	403	53.24
Fish	125	20.73	124	16.38
Tobacco	66	10.95	66	8.72
Tea	48	7.96	47	6.21
Maize	24	3.98	18	2.38
Flowers	23	3.81	29	3.83
Cotton	20	3.32	13	1.72
Cocoa	16	2.65	23	3.04
Beans	10	1.66	18	2.38
Sesame seeds	5	0.83	16	2.11
Total	603	100.00	757	100.00

Source: UBOS (2009)

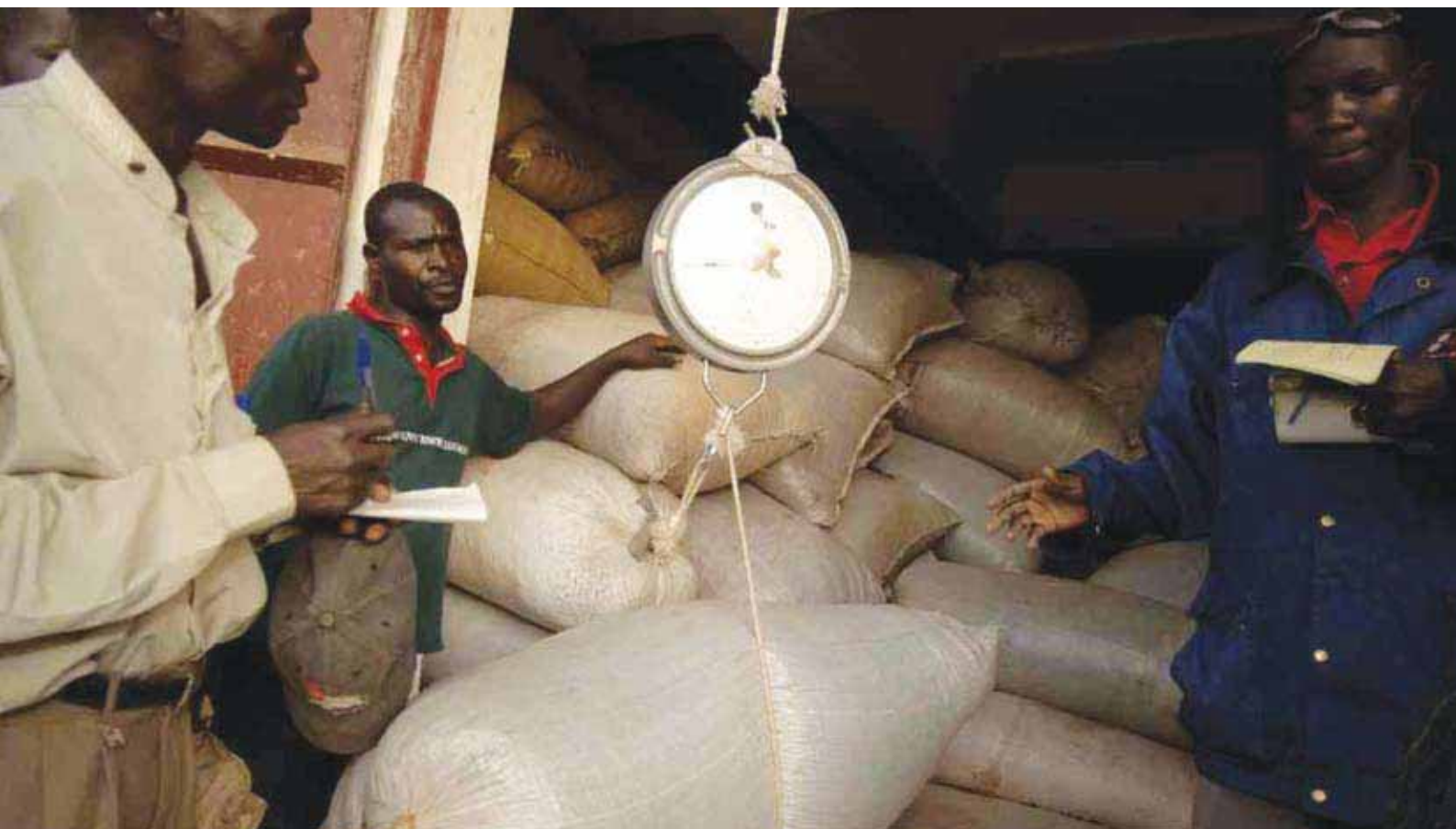
Performance of Coffee Sub-sector since 2001/02

Table 2 shows the trends in coffee exports by volume and value since 2001/02. It shows a sharp drop in volume from about 3 million-60 kilo bags in 2001/02 to a low of about 2 million bags in 2005/05. This was largely a result of coffee wilt disease and to some extent prolonged dry weather which affected flowering and fruiting of the crop across the year. However, there is a reversal in the trend from 2006/07 to about 3.05 million in 2008/09. This is due to the effect of the replanting programme under PAF of 2001/02 to 2004/05. It takes 4 years for a coffee tree to come into full production.

Table 2: Uganda's Coffee Exports from 2001/02 - 2008/09

Coffee Season	Quantity (60 Kg Bags)	Value US\$	Unit Value US\$/Kg
01/02	3,146,381	83,936,951	0.44
02/03	2,663,888	104,787,094	0.66
03/04	2,523,042	115,705,844	0.76
04/05	2,504,890	162,146,235	1.08
05/06	2,002,324	170,362,075	1.42
06/07	2,704,236	256,580,844	1.58
07/08	3,211,256	388,412,769	2.02
08/09	3,054,848	291,832,877	1.59

Source: UCDA, Statistical Estimates.



Coffee Value Chain Description – Post Liberalization

The coffee value chain trading post liberalization is characterized by several players at all levels of trade. The dominant group consists of the private sector exporters, processors and middlemen who account for 90 percent. There is limited participation of Cooperative Unions through their umbrella body, UNEX. One of the more active of these is Bugisu Union, which has been revived and recapitalized, and is able to generate crop finance for farmers.

The coffee trade is largely pre-financed through domestic borrowing, largely from off-shore funds channeled through the dominant foreign based firms which control about 60 percent of export trade.

Harvest and post harvest handling

Liberalization of the coffee sub-sector in 1991/92 opened up the industry to several players especially at the primary and secondary processing levels. This created stiff competition at farm level and has

continued to affect the quality of coffee harvested and sold by growers. Lack of price differentiation between well picked and badly picked and dried coffees gives growers no incentive to selectively pick ripe cherries. Rather they pick for quantity, stripping the bearing branches. Coffee buying at the farm level is dominated by 'Debe boys', who sell on for further processing, and also act as moneylenders, advancing funds to growers who, in return, promise access to their crop.

Primary processing

Information from UCDA shows that there is excess primary hulling capacity. The number of primary processors has varied between 200 and 300 in the last ten years. Excess capacity processing has resulted in increased competition for picked and dried cherries, with insufficient attention being paid to quality. UCDA is attempting to combat this situation through regular monitoring and ensuring compliance to regulation. To date this has had limited success.

Grading and Marketing

Export grading and export marketing is also liberalized. The industry at this level seems to be over concentrated, with over 60 percent of total exports, for example, in the last three coffee years being dominated by foreign-based firms. The three larger ones include; Kyagalanyi Coffee Ltd, Ugacof (U) Ltd and Kawacom (U) Ltd – see Table 3 below.

Table 3: Coffee Export Performance by Firms for the last Three Coffee Years (60kg bags)

Company	2008/09		2007/08		2006/07	
	No. of bags	% Vol	No. of bags	% Vol	No. of bags	% Vol
1. Kyagalanyi Coffee Ltd	527,572	17.28	512,715	15.97	408,536	15.11
2. Ugacof (U) Ltd	285,198	9.34	474,083	14.77	566,687	20.96
3. Kawacom (U) Ltd	407,408	13.34	434,819	13.54	358,553	13.26
4. Job Coffee Ltd	221,151	7.24	271,203	8.45	209,460	7.75
5. Ibero (U) Ltd	201,811	6.61	270,128	8.41	189,167	7.00
6. Great lakes (U) Ltd	271,351	8.89	237,089	7.38	225,234	8.33
7. Kampala Domestic Store	241,947	7.92	222,068	6.92	74,870	2.77
8. Lakeland Holdings Ltd	228,570	7.49	200,487	6.24	59,330	2.19
9. Savannah Commodities	225,619	7.39	189,224	5.89	101,570	3.76
10. Pan Afric Impex	73,055	2.39	115,799	3.61	195,044	7.21
11. Other	370,006	12.12	282,988	8.81	315,785	11.68
Total	3,053,688	100.00	3,210,603	100.00	2,704,236	100.00

Source: UCDA Annual Reports, 2006/07; 2007/08; 2008/09

Contrasting Sundried and Washed Robusta Coffee

Uganda Robusta is mainly sundried and marketed as processed FAQ (Fair Average Quality coffee). Wet Robusta processing is being reintroduced after it fell into disuse during the troubled period of the Amin regime.

The major advantage of wet Robusta over sundried is that it is easier to control quality, since it ensures that only ripe, red cherries are pulped, compared to sun dried coffee where it is difficult to differentiate after drying between unripe, green and red cherries.

In terms of pricing at export, there is a reported premium of up to US\$800 per tonne over and above that for conventional sun-dried Robustas.

Challenges To Robusta Production and Marketing

Some of the key challenges to Robusta coffee marketing reported by the industry agencies include:

- **Lack of dynamism in farmer groups.** Consequently, farmers cannot pool their coffee together to attract a higher price.

- **Limited value addition.** Most farmers are still selling Kiboko (unhulled) coffee at relatively low farm-gate prices. Establishment of farmer groups and provision of wet processing equipment will permit an improvement.
- **Inadequate supply of Kiboko** coffee to the processing factories leading to excess capacity of most processing factories (both primary and secondary). Inadequate supply also forces exporters to scramble for the little crop, leading to deterioration in quality as farmers strip harvest their unripe coffee in a bid to satisfy the increased demand, instead of selective picking of ripe cherries.
- **Increasing deterioration of quality** of coffee due poor post-harvest handling and marketing activities. Differential pricing based on quality is a key measure for bringing about improvement here.
- **Fluctuation in international prices** which translate into low prices in the domestic market. This in turn leads to reduced interest in the improved post-harvest handling of coffee.



- **Limited grades for the dynamic international markets.** Uganda's Robusta has a higher intrinsic value compared to other Robustas. However, the current grading system does not reflect this difference.
- **High interest rates from commercial banks.** This hinders traders from acquiring marketing finance to permit trading in economic volumes, to reap economies of scale.

Other Challenges to Coffee Subsector Production and Marketing

Other challenges to coffee production and marketing include low volume exports due to the recent emergence of the coffee wilt disease (CWD), aged coffee trees, low input use, lack of policy response to replanting, inadequate control of pests and diseases, limited farmer organizations for effective technology update, bulking and marketing of coffee and limited micro finance access for progressive farmers and for the emerging farmer associations.

Mentioning of production aspects, Uganda's coffee production by area and volume has stagnated at about 300,000 hectares and 3 million 60-kilo bags since 1964. In addition, most of the old standing stock, over 70 percent of trees, are over the economic optimum age of 40 years. The situation has been aggravated with the recent emergence of the CWD which has destroyed a cumulative tree stock of old Robusta of about 168 million trees (UCDA/COREC, 2005-2009). At a yield average of about 0.5 kilo of clean coffee per tree per year, this is equivalent to 84,000 MT of clean coffee, and about 140 million US dollars at average export price of about 1.6 US dollars per kilo (FoB/R) Kampala.

The impact of the CWD led to orientation of the coffee research agenda towards generation of resistant varieties for controlling the disease. In 1997 a breeding programme was initiated at the Coffee Research Centre (COREC) to develop CWD resistant Robusta varieties of acceptable farm and market traits. Through screening, over 1,519 CWD resistant Robusta genotypes were identified (Musoli, 2007). Through evaluations, the best 7 clones have been released for rapid multiplication. What is reported

by COREC as a challenge is adequate financing for generating sufficient mother stock for farmers and private sector to get access for further propagation. Support in this area is required for future sustainability of Robusta production for Uganda.

Pricing and marketing limitation to quality improvement at farm level

The solution to the quality problem at farm level – noted above – is not only differential pricing for quality, but also organization of farmers into producer based groups where coffee can be bulked, processed and marketed. Notable examples include the KCA project farmers in Mubende/Mityana, the NUCAFE Association in Masaka and Mpigi, Ankole Growers Association etc. These have demonstrated that it is possible to bulk, process and market coffee as a group. There is evidence of income gains of about UGX. 300 to 400 per kilo of FAQ equivalent.

Increasing The Volume Of Washed Robusta

In the 1960s and 70s, Ugandan Robusta coffee was processed mainly by Indian-owned firms. The proportion of wet Uganda Robusta was about 20 percent. In an attempt to revive wet Robusta processing in Uganda, the Government through UCDA initiated a wet Robusta processing project in 2002. As a result, 16 units of machinery were procured through Government funding.

UCDA field evaluations show that performance is below the expectations. Out of the 16 sets of equipment purchased, only five are installed and operational. Others apparently lack the capital for installation. It is likely that the failure of this project could be the reliance on the wrong target operators – something that could have been avoided had an adequate pre-feasibility assessment been carried out.

Constraints to wet processing of Robusta coffee observed include limited crop finance for wet cherry, together with the difficulty of organizing the delivery of newly-picked cherries, within a few hours (as is required) to the wet processing plant.

Levels of investments and organizational arrangements

The pilot project, mentioned above, invested in sets of washing machinery and equipment each costing about UGX 100m, with an average capacity of 3.5 MT per hour. Clearly this large investment is more relevant for estate production than for smallholder groups.

On a smaller scale to that mentioned above, equipment that would permit a throughput of 0.5 – 1 tonne per hour would cost in the region of UGX 40m. The recent intervention in Bugisu region by exporters in enabling farmers to establish medium-sized wet processing infrastructure on a recovery basis (UCTF, 2009), confirms that this is possible.

Example: The NKG Coffee Alliance And Kaweri Coffee Farmers Alliance Support Project

The Neumann Kaffee Group is a German coffee producer and wholesaler that operates internationally - in South America, Africa and Asia.

In 2005 NKG initiated coffee estate establishment in Mubende. In order to increase throughput for their processing plant, they initiated a farmer-based project in 2005, called Kaweri Coffee Farmer Alliance Support Project (KCFASP) with EU funding.

This followed the NKG interest in establishment of the large scale coffee estate in 2000. The aim of the Kaweri alliance project was to create a farmer-driven extension system among outgrower farmers with a view of supplementing the volume potential of the Kaweri Estate in Buwekula in the long run. In the event the onset of CWD prevented processing of outgrowers' coffee on the Kaweri Estate, but technical assistance continues.

To date, on the estate, about 2,000 ha of clonal coffee has been established, employing over 700 workers. Services of technical extension for nursery development in the surrounding communities has been provided. Also services like water provision, health care and training of mid-level technicians and extension workers has been rendered by the Kaweri Estate. The NKG Coffee Alliance Support Project is therefore an affiliate to Kaweri Coffee Estate. The initial target area was Mubende but it was later extended to cover Mityana, as Mityana seemed to have more farmers and more young coffee.



Location and Organizational Structure

The Project has organized coffee growers into 447 Producer Organizations (POs), while a number of POs form one Depot Committee (DCs). Each PO is comprised of about 30 farmers, while the total for a DC is about 600 farmers. Of the 24 DCs, 22 have incorporated as depot companies. In total there are about 15,000 farmers involved, who receive advisory services from project technical experts.

Marketing and Market Linkages

Under the programme, farmers have been mobilized to own the value chain from production through harvesting, drying, bulking, processing and marketing. All the Depot Committees (DCs) have established their own warehouses. The programme has created Zonal Marketing Committees to coordinate the collection and transportation of coffee from the DCs to central marketing points where the buyers access this coffee.

Trade of this coffee is through a free market mechanism guided by the indicative prices provided by UCDA. A recent advance is that the committees are linking directly with exporters in Kampala. This has resulted in further improvement of farmers' margins.

A key issue is that only some 30 percent of participating growers' production is being channeled through the Alliance structures. This is because many growers have borrowed from Debe boy traders, and are obliged to deliver a significant proportion of the coffee to these intermediaries as part of the loan arrangements. For the reasons given above, use of the Debe boy intermediaries is a major challenge to the improvement of quality. Clearly the obvious way to tackle this major problem is to organise alternative sources of financial services.

Another financing requirement is marketing finance for the Depot Companies (Committees) to be able to purchase coffee and make a significant

partial payment on delivery. The fragile nature of the finances of almost all of the Depot Companies makes it difficult for them to access the short term funds they need for this purpose – which would go a long way to attracting more throughput of coffee. Moreover, if the scale of the businesses were to increase, it will become more feasible for the Depot Companies to attract investment to enable conversion to wet processing.

600 farmers with an average crop output of about 150 MT. Allowing for a 50 percent advance payment on delivery, and input credit every season, the amounts required are given in Table 4, 'Marketing Finance'. The funding volumes assume a turnover of crop marketing through the DC of about 15 times a year. Inputs used by farmers include: fertilizers, herbicides and tarpaulins.

Table 4: Estimation of minimum finance requirement for a Typical DC under Alliance

Type of input	Estimated amount p.a.	Price per Unit UGX	Amount Required UGX	Commission of up to (15 %) UGX
1. Roundup	2,000 litres p.a	12,000	24,000,000	3,600,000/=
2. Fertilizers	1200 bags of (NPK/CAN);	50,000 / bag	60,000,000	9,000,000/=
3. Tarpaulin	600 pieces	50,000/=	30,000,000	4,500,000/=
4. Marketing Finance at 50% kiboko value	150 MT	1,000,000	75,000,000	11,250,000/=
Total			189,000,000	28,000,000

Efforts are ongoing to address these needs. It is hoped that reports on progress can be included in future editions of the Yearbook.

Thus, from Table 4, it is estimated that a typical DC would require a peak drawdown of about UGX 189m for input loans and marketing finance.

Typical Loan Amounts Required For Improved Processing/Marketing

The example used is based on a success under the NKG Coffee Alliance, the Kiterede Depot Committee. An average Depot Committee is reported to have

In the liberalized framework of the coffee industry, there have been several efforts by farmer-focused programmes and agencies to mobilize and sensitize of farmers to form groups with an objective of increasing their marketing efficiency and enhancing access to finance.





As a result of the various interventions, several farmer-based farm level organizations (FLOs) have been initiated. These include: Kibinge Coffee Farmers' Association with about 3,000 farmers, Ankole Coffee Farmers Associations with over 2,000 farmers, Okoro Coffee Farmers Associations, Buwama Coffee Farmers, a few others in both Robusta and Arabica areas. Their operational framework is similar to that of the NKG Coffee Alliance. The limitation is that they have not yet been organized to that level in terms of production and bulking their coffee for the market.

With enough resources, these initiatives could further be developed to NKG Coffee Alliance level. It therefore argued that further interventions are needed to consolidate these efforts and create new ones if Uganda is to increase coffee output levels through interventions that stimulate production and marketing at farm level.

Annex I: Marketing Performance of Bulk Kiboko for Coffee Alliance since 2005

Volume of coffee bulked by the DCs (Kg Kiboko)	Crop 05/06	Crop 06/07	Crop 07/08	Crop 08/09
Main Crop	124,875	605,920	667,102	665,005 +
Fly Crop	123,299	89,797	342,840	
Total	266,174	695,717	1,009,942	

Annex II: Progress on Adoption of the GAPS² among the KCA Coffee Alliance Farmers

Pruning(%)			Mulching(%)			Weed Control (%)		
2007	2008	2009	2007	2008	2009	2007	2008	2009
29%	63%	62%	25%	34%	52%	43%	64%	73%

Source: Kaveri Coffee Project Reports, 2009.

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² GAPS refers to good agricultural practices

3.3 Rice Processing and Marketing ¹



Brief description of the local and regional markets for rice, trends in both demand and Ugandan production.

The local demand and consumption of rice has steadily increased over the past two decades, and is estimated now to be over 100,000 MT per annum. The growth is in direct relation to increase in urban population in Uganda. The domestic production has similarly increased over the years to try and meet the ever increasing demand. Uganda has had to heavily rely on imports, making rice a high ranking import commodity of over 50,000 MT per annum in the past years with the growth of import outweighing growth in local production, until recently.

Local production has been stimulated by the high demand and profitability. Expansion of area under rice production, introduction of the NERICAs (upland rice varieties) and adoption of improved production practices has all contributed to the increase in domestic production.

Similarly, there has been an increase in the number of processors over the years from the one main processor in Kibimba (now Tilda) to over 10 other medium to large scale processors like Upland Rice Millers (URM) in Jinja. This is in addition to the hundreds of small scale mainly rural based millers.

In Eastern Africa, Tanzania is the largest rice producer averaging over 500,000 MT per annum of unshelled rice. It is also a dominant consumer of rice in the region, with imports of rice into the country growing profoundly during the past decade. In contrast, Kenya is the smallest producer and the largest importer of rice in the region with an average annual demand of about 300,000 MT. As for Rwanda, both rice production and consumption are comparatively low, although it is still a deficit market.

¹ Author: Patrick Oyee, USAID - LEAD

Varietal Demand and Supply

Rice is grown by Ugandan farmers mainly as a cashcrop, however, farmers consume the local varieties of rice, which are readily available at home or in the nearby rural shops. In rural areas, quality and variety are not usually the issue that they are in urban areas, due to both lack of choice and lower purchasing power.

The urban dwellers who consume rice are very specific about their choices. When purchasing rice, the qualities or preferences that the urban dwellers look for include aroma, colour, taste, and relative proportions of whole and broken rice. The elite urban consumers are known to prefer premium brands of imported rice such as Basmati rice as well as local brands and varieties, in particular the Tilda brand, Super rice and upland rice.

Kaiso is the most popular and dominant rice variety currently in the market. According to URM, Kaiso makes up about 80 percent of their total milled quantities while the Super and upland rice varieties only make up about 10 percent each. The Kaiso variety is known to be popular with institutions like schools, due to its swelling qualities when cooked. The Super and upland varieties are particularly popular with the elite urban consumers due to their aromatic and non-sticking properties. There is currently an influx of Super rice from Tanzania selling at UGX 1,700, compared to the Ugandan Super currently at UGX 1,900 per kg.

The quality of rice milling also determines the price and demand. Rice from the more sophisticated mills like URM, that produce better quality in terms of grain cleanliness and fewer broken grains, fetch comparatively higher prices.

Current constraints to efficient buying of crop from growers

There are a number of challenges that affect the efficient purchase of rice from the rural producer, with quality and bulking constraints being the most critical.

The rice quality challenge at producer level is principally due to limited knowledge of quality standards, lack of post-harvest knowledge and shortage of appropriate storage facilities. The bulking process by local, small-scale buyers further aggravates the problem, through aggregation of non-uniform quality rice from various farmers.

The lack of uniformity in quality is principally a result of differences in post handling practices and mixing of varieties, especially Kaiso and Super. It is also known that some sophisticated millers with better machinery can afford to buy any quality of grain from farmers thus further abetting the quality challenge. This is because they have the capacity to process any rice quality with their advanced drying and sorting capacities. In addition, some of the millers have markets for the lower quality broken grains usually required by the breweries.

Other constraints in buying rice from producers include:

- Inadequate working capital and storage facilities undermining bulk purchases and restricting scale economies;
- Poor means of transport, exacerbated by inaccessible road networks, especially during the rainy season;
- Unreliable supply of paddy and lack of market information, which give rise to market uncertainties. In addition, the cash-based transactions create high security risks i.e. the carrying of huge sums of cash.

Milling and Packaging Constraints

Poor quality paddy received from farmers or local traders gives millers a number of problems, including: increased operational costs in terms of extra cleaning and drying costs, low processing out-turns and equipment damage. In addition, there is the low consumer preference for the inferior quality milled rice.

Power supply is a major constraint in the milling industry. Almost all mills in Uganda have their milling capacities greatly restricted by power irregularities. In the case of URM, irregular power supply accounts for about 70 percent of the milling stoppages.

High cost of improved machinery required to produce high quality products and branding is a further problem. In addition, machine breakdown is, of course, another inevitable and natural constraint but this is sometimes aggravated by the poor quality of paddy that translates into a lot more wear and tear on machinery.

Lack of finance is similarly a critical bottleneck in the rice milling industry. Affordable financing for both working capital and purchase of improved machinery is not easily accessible to many medium-



large scale millers in Uganda. As a result, most rice processors are limited to the less lucrative toll milling business (contract milling) as opposed to trade-based milling that involves procurement of rice for milling and marketing. The latter arrangement offers opportunities for earning greater margins.

Other notable challenges experienced by millers include: limited storage facilities at processing plants and lack of investment in value-addition of by-products.

Marketing Constraints

The marketing challenges in the rice industry in Uganda include the following:

- a) Limited branding and packaging of local rice limits appropriate product differentiation to cater for various consumer categories.
- b) There is a lack of rice standards, both at producer and processing levels. Such standards would facilitate appropriate price differentiation. As a result, the current rice chain does not reward quality improvements, since farmers are not paid premium prices for quality rice.

- c) Competition from imported rice is fierce, especially in the light of high production costs and lower quality of local rice. In addition, there is the lack of information about Ugandan rice in terms of quality and taste.

Given the current buoyant market, how effective are the price signals to growers? Are there any examples of improved marketing mechanisms, in the sense of greater efficiency for those in the value chain?

Branding

To better penetrate the local and regional markets, numerous processors including Tilda, Upland Rice Millers in Jinja, Vero in Mukono, Pasam in Pallisa and Savannah in Kampala have their own brands of local rice. Branding of rice is advantageous in that it can segregate the market in the processor's favour; however, the main challenge is that for the less sophisticated consumers that form the majority in Uganda, branded rice usually needs some time to penetrate the market, unlike the unbranded types. In addition, branding requires extra machinery for cleaning, sorting and packaging, which most local mills cannot afford.

Financial services available to investors in the rice industry

Producers

Production loan products are available with Centenary Bank, an institution that is known to finance rice farmers in Kapchorwa, Bukedea, Butalegya, and Lira. The loans are mainly seasonal, for a maximum of six months, to finance inputs and labour requirements. The major risk involved in rice production lending is drought and to a lesser extent price risk. Unlike other commodities like maize, rice does not have any market risks, as demand still outstrips supply in Uganda.

In regard to the drought risk, lowland rice (grown in swampy areas) similarly furnishes a less risky lending option compared to upland rice that relies entirely on rainfall. It is for this reason that lowland areas of Doho in Butalegya district and Olweny in Lira district have attracted a lot of production financing. It should be noted, however, that despite the lower drought risk, lowland rice unit production costs are higher and also produce lower yields.

Animal traction products by Centenary Bank to finance the purchase of oxen and equipment are also available and are being rolled out in the districts of Soroti, Mbale, Kapchorwa, Lira and Masindi. These can be similarly accessed and used for rice production activities.

For profitability purposes, farmers are encouraged to prioritize borrowing for yield enhancing inputs such as improved seed, fertilizers and herbicides. In this way, the farmer is assured of increased yields that will enable him to make a profit after interest, a message that all extension agents should emphasize.

It should also be noted that numerous farmers in Uganda also utilize microfinance from the various lower tier financial institutions such as SACCOs and MFIs for their farming activities, though such financing may not necessarily be tailored for agricultural production in terms of both loan amounts and repayment tenors.

Processors

Medium and large scale rice processors require term financing for equipment purchase and working capital for procurement of paddy for processing and sale.

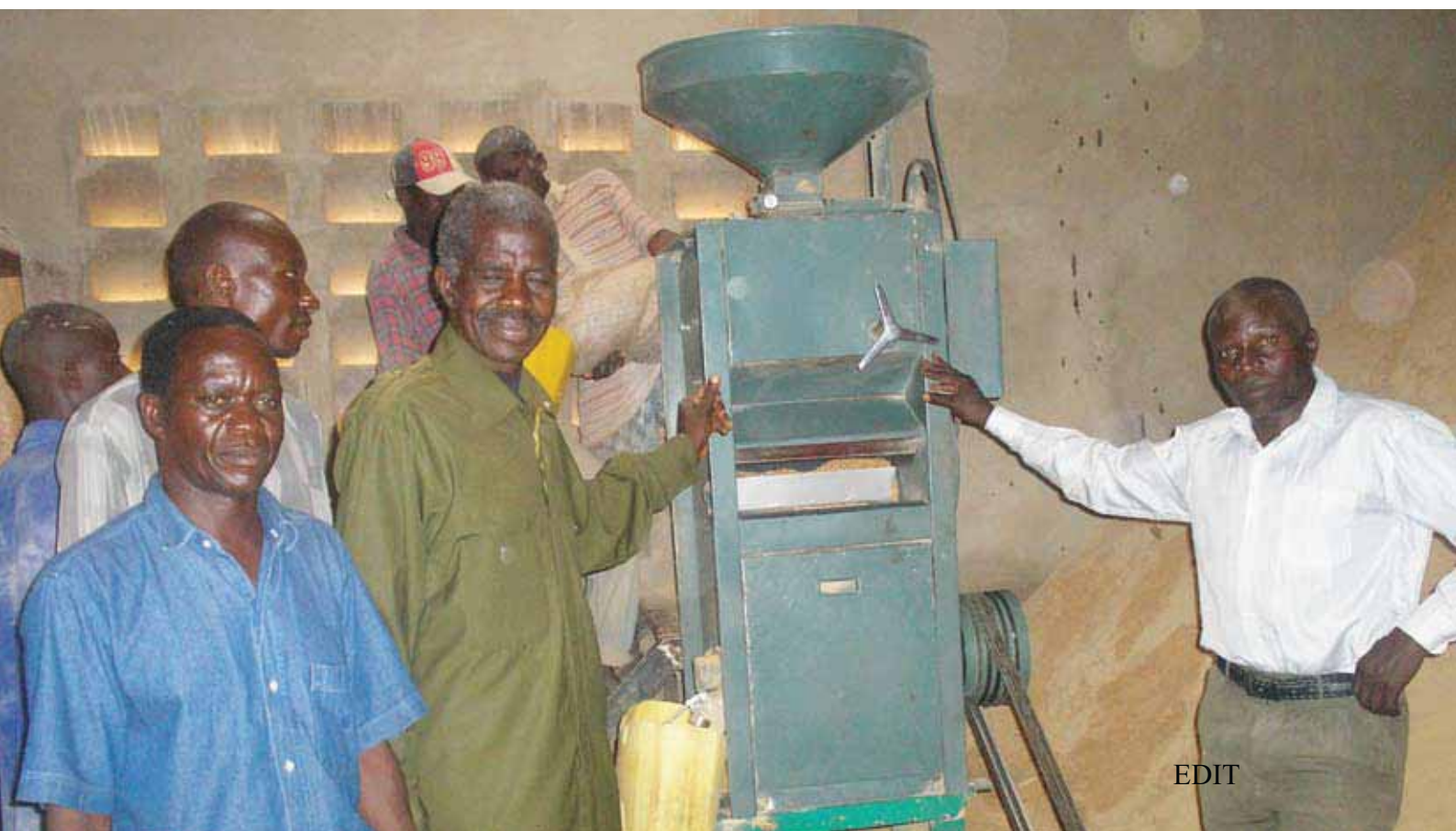
Medium and long term financing products are best suited for equipment finance. An example is the Asset Leasing products now available with most commercial banks. Medium and long term loans, available particularly with the development banks, can also be used for the acquisition of rice milling equipment.

A standard modern rice mill (with a pre-cleaner, destoner, huller, paddy separator, whitener, grader and polisher) that produces high quality rice would cost to the tune of USD 150,000. This is in addition to the building and civil works costs estimated at USD 100,000. The latter cost could be higher, depending on the size of the storage facilities. An even more modern mill, with an extra pre-cleaner and whitener, colour sorter and the extra production lines required if branding is carried out on the packaging, would cost USD 50-100,000 more than the standard version.

For financing this substantial level of investment, lease products may well be suitable in that the usually prohibitive collateral requirement is overcome by using the rice mill machinery itself as the security. This is enabled by the Bank retaining full title to the asset, while the customer has use of the asset until fully repaid, after which ownership is relinquished to the customer. The other important advantage of the leasing product is that since it is self collateralized, it frees other assets for securing additional borrowing, such as for working capital.

Short term working capital of USD 200,000-500,000 is sufficient to run a modern processing plant of 15,000 MT installed capacity. Working capital can be accessed from most banks in the form of overdraft loans, however some lenders offer the more creative structured commodity trade finance facilities. These involve the transactional short-term, self-liquidating financing of commodity flows from the point goods have been sold until repayment. Warehouse receipt financing is also a form of structured trade financing. This would suit rice trade finance in Uganda as it allows lending banks to take security against commodity stocks (in this case, rice). The product experiences various operational challenges that are yet to be overcome in Uganda. A functional warehouse receipt system that is based on the Warehouse Receipts Act would allow farmers traders and processors to use stocks as collateral for loan advances.

On the other hand, non-negotiable warehouse



EDIT

receipt financing, which is not based on the Warehouse Receipts Act. Rather it operates on the basis of a tripartite agreement between the lending bank, borrower and an independent collateral manager. The arrangement is offered by several banks and has been successfully practised for over a decade in Uganda to finance agricultural commodity trade. It can also be used to access working capital for rice processing.

Rice Contract Farming Possibilities

Contract farming is an undertaking whereby farmers grow rice to supply a specific buyer at a specified price and time, based upon agreed conditions. It usually also involves the supply of inputs on credit by the contracting buyer. The contractor may be: Land Owners who are leasing land on contractual conditions, especially applicable to lowland owners; Traders and Millers whose intention is to guarantee paddy supply; or Financial Institutions

with extended value chain interests, to ensure proper off-take and recovery of production finance extended to its clientele, especially where the clients are geographically concentrated.

Rice, is a commodity with high demand, multiple buyers and processors, and can also be consumed by the farm family. This is in contrast to a crop like cotton which has limited uses, buyers and processors. The nature of rice and of the rice industry therefore creates unique challenges for contract farming. Therefore successful rice contract farming in Uganda needs the development of attractive risk management strategies that will prevent strategic default in terms of diversion of contracted paddy.

Other inherent challenges to rice contract farming include: lack of respect of contractual obligations by both farmers and other buyers; lack of weather risk management strategies; poor farmer organisation; and low farmer productivity.

Despite the various challenges, there are notable situations and areas that present opportunities for successful rice contract farming. These include the following:

- Outgrower schemes: with farmers in close proximity with large farmers and mills such as Tilda in Kibimba;
- Irrigation schemes: where farmers lease and use irrigated land in a very organized manner such as Olweny in Lira and Mubuku in Kasese;
- Appropriate farmers' organisations; with strong and sustainable farmer organisation structure that enables appropriate management, and supervision of contractual obligations.

3.4 Maize Production, Processing and Marketing: Opportunities for Smallholders ¹



Section I: The Ugandan Maize Industry

The maize sector is becoming increasingly important in Uganda's economy. Maize is growing in prominence not only as a food security crop, but also as a cash crop grown by small scale farmers. Production of this crop forms an important part of the farming system in many parts of Uganda. However, the major producing districts are Kapchorwa, Iganga, Mbale, Masindi and Kasese, where 75-95 percent of the national household harvest is produced. It is estimated that annual production of maize ranges from 500,000 to 750,000 metric tons, of which 95 percent is carried out by subsistence small-scale farmers, and 5 percent by commercial farmers.

In some areas two crops of maize per year are possible; in others just a single crop is grown. Maize varieties planted tend to vary by district. *Longe* maize varieties (4 and 5) plus hybrid maize varieties (6H and Salongo) are commonly grown in the districts of Iganga, Masindi and Kasese, where two crops can be grown in a year. In Mbale and Kapchorwa, where only one crop is grown annually,

the common improved varieties are hybrids (8H and upland hybrid varieties).

Harvesting of maize takes place in two major peak periods in a year. The first harvest season takes place between January and March, while the second harvest season occurs in July-August. The only exception is Kapchorwa District, where harvesting takes place from October and December. This means that between April and July, and in the month of September, the supply of maize grain in the market is at its minimum.

Furthermore, maize production is generally characterized by low yields, which lead to high production costs and thus, low returns. The average estimated maize yields vary between 400 – 2,500 kg/acre (about 4 to 25 bags per acre). Unit production costs vary between UGX 125-255 (US 7-14 cents) per kg. Therefore, the resultant gross margins are usually dependent on the prevailing market prices, which tend to be higher in the off-season than on-season.

¹ **Author:** Richard Wangwe, formerly ASPS II - Danida

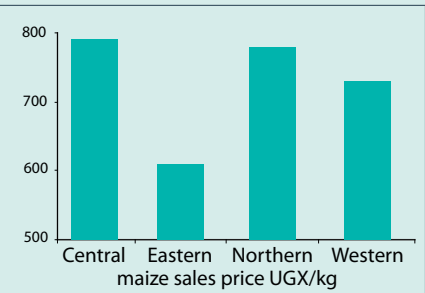
Maize Production versus Consumption

The maize production-consumption balance position shows that Uganda has always had maize surpluses since 1997. In real terms, marketable maize surpluses varied between 50,000 –200,000 MT from 1997-2005. Currently, the marketable maize surplus in Uganda is estimated at between 300,000 and 400,000 MT per annum, with more than one-half of it coming from the eastern part of the country. (See Table 1)

other temporary food-deficit regions in the Great Lakes region may continue to warrant WFP supplies of maize, sourced from Uganda.

In recent times WFP has targeted buying direct from producers or groups of producers in order to provide growers with better returns. This is still at an early stage, as growers and groups face problems in bulking maize of sufficient quality and doing so at the required time. Considerable efforts are now being directed to addressing this difficulty,

Table 1: Maize Production and Average Prices (UGX/kg) per Region *

Estimated Production and surplus by leading districts (MT)			
Leading production district	Production level	Market surplus	
Iganga, Bugiri, Kamuli (East)	183,000	141,000	Central Eastern Northern Western maize sales price UGX/kg
Kapchorwa, Mbale (East)	146,000	110,000	
Masindi, Hoima (central)	135,000	102,000	
Kabarole, Kamwenge, Kasese (west)	62,000	47,000	
Total	526,000	400,000	

* Prices quoted refer to maize off-truck, delivered to a regional centre.

Source UBOS

A further breakdown of Uganda's maize production indicates that 15 percent is lost through post harvest losses, 20 percent is retained at the household for consumption and seed requirements, while 50 percent is consumed internally by institutions, consumers and limited industrial usage. This implies that a balance of between 10-15 percent of the national maize production is available for export annually (RATES, 2003)².

Demand Outlook

The domestic demand for maize grain, though increasing, is still quite low compared to production hence, to dispose of its maize surplus, Uganda has to rely on export markets. Three maize export market segments exist: relief/food aid, informal cross border trade, and the formal regional market.

WFP is the largest single purchasing organization for maize in Uganda and accounts for 40-50 percent of the export maize market in Uganda. The maize purchased by WFP is destined for relief operations, mainly in Uganda and Kenya. As peace has now come to Northern Uganda, and as farmers return to the land, so too production of food has steadily increased. Accordingly, WFP is expected to reduce purchases for this population. On the other hand,

among others by WFP partner organizations, such as NAADS, UCA, ASPS II-Danida, Sasakawa Global 2000 and by USAID projects.

Informal cross border trade with neighbouring countries (Kenya, Democratic Republic of Congo and Rwanda) is carried out at the border crossings by transferring maize grain through the border posts "on-the-back-of-a-bicycle". The Kenyan market, which accounts for about 50 percent of the total exports, is a significant outlet for Uganda's maize, although occasionally it is hindered by the presence of non-standard (low quality) maize and lack of working capital among Ugandan traders. Maize grain traded is often of poor quality due to its high moisture content (sometimes as high as 19-22 percent, when the standard is a maximum of 14 percent) and contamination with foreign material (dust, stones, cobs etc.). Wet maize is susceptible to fungal and fermentation damage.

Therefore trade in this market tends to be "opportunistic" since it involves wet and un-cleaned grain. As a result, prices offered are generally low, that is US\$30-50 per metric tonne below the price of commercially traded maize. Besides, the informal trade market is driven by Kenyan traders who have the necessary finance, and therefore the upper hand in price negotiations.

² **RATES (2003)** "Maize Market Assessment and Baseline Survey for Uganda" Regional Agricultural Trade Expansion Support (RATES) Program, Nairobi Kenya



Formal exports: Apart from regular formal exports to Kenya, in 2001-2002, Uganda formally supplied about 30,000 MT of maize, worth US\$ 3.4 million FoB to Zambia through Uganda Grain Traders (UGT) Ltd. However, delivering maize to the Southern Africa markets is much more costly than shipping maize from South Africa to the same markets. Thus Uganda cannot compete with South Africa for the Southern Africa maize market.

Sudan presents a different scenario. Uganda is well positioned in terms of comparative advantage to supply maize to Southern Sudan. Since the border is not as porous as that of the Uganda/Kenya border, exports of maize tend to be formal, through grain traders. Similarly there is limited formal export of maize to Rwanda, paralleling the informal cross-border trade noted above.

Key Participants in the Maize Value Chain

The maize value chain is dominated by a number of key players which include farmers, rural traders, urban traders, large-scale traders/exporters and millers.

Rural traders buy and assemble maize from numerous scattered small-scale farmers in inaccessible areas using bicycles and motor bikes. They form a reliable linkage between farmers and urban traders and thus sometimes act as agents or brokers of urban traders.

Urban traders (in major trading centres and district towns) comprise less than 10 percent of the total number of maize traders and handle about 30 percent of the traded maize. The main activities of urban traders include networking with rural traders serving as a market outlet for commercial farmers, assembling, bulking, and pre-cleaning maize grain before selling it to institutions, large-scale traders, millers, and export markets. Urban traders also provide market information about price and volumes within their areas of operation.

The large-scale traders live mostly in Kampala and comprise less than 1 percent of the maize traders nationally. Nonetheless, these traders handle about 30 percent of the traded maize. Their major roles including networking with urban traders, serving as a market outlet for commercial farmers, pre-cleaning, fumigating and verifying, and re-bagging maize grain before it is exported. Large-scale traders store maize grain between one to two months, depending on the availability of the market and sources of capital. They supply millers in the domestic market as well as international relief agencies and regional markets. Large-scale traders also provide market information to urban traders and commercial farmers, and search for markets for surplus maize.

Uganda Commodity Exchange (UCE) is engaged in maize marketing by bringing together maize sellers (who are mainly urban traders, commercial farmers and a few organized farmer groups) and buyers (local and foreign companies). It encourages sellers to consolidate high quality marketable supplies of maize for offer through the Exchange, and to purchase inputs in large volumes to achieve economies of scale. As part of UCE strategies to facilitate commodity trading in both local and regional markets, the Exchange is encouraging stake holders to take advantage of the warehouse receipt system (WRS) for purposes of accessing finance from banks.

Maize millers are of three types: small-scale, medium-scale, and large-scale. The small and medium sized millers do small domestic milling plus offering both contract and trade based milling services to institutions and urban traders. The large scale millers have modern machinery with large milling capacity, large warehouses and bulk handling systems. They restrict themselves to trade-based milling, and normally supply the flour to institutions and relief agencies. Apart from the profit from value addition in processing, the stocking of maize grain, especially for off-season supply, forms the basis for their profitability.

Section II: Constraints in the Maize Value Chain

The main constraints faced by the farmers include:

- Limited use of improved inputs and new technology, owing to high input prices, poor input delivery systems, poor access to credit, lack of information, and hesitant farmer attitudes towards improved inputs and new technologies.
- Scattered, disorganized and low marketable surpluses result in high product assembly costs.
- Lower bargaining power at peak harvesting season, due to individual marketing and limited enterprise diversification at farm level.
- Dependence on expected spot prices as the main stimulant for profits results in fluctuations in volumes between seasons, which create market uncertainty.
- Inadequate and asymmetric market information results in exploitative tendencies by middlemen.
- The lack of appropriate post harvest handling technologies and practices leads to poor quality product and to sale of produce immediately after harvest. The resulting market glut forces prices to fall.

Indeed, poor post harvest handling and inadequacy of proper on-farm storage facilities results in widespread failure to achieve the gazetted quality standards (especially on moisture content). This can lead to significant increases in costs and high loss percentages.

The main constraints faced by the traders and millers are:

- Limited knowledge of quality standards and lack of access to relevant testing instruments undermines quality appreciation and enforcement.
- Lack of post-harvest knowledge and poor storage facilities result in wastage and a poor quality product.
- Inadequate working capital and insufficient storage restrict volumes and constrain the extent to which bulk purchases can be made, and scale economies realised.
- Poor means of transport, exacerbated by inaccessible road networks, especially during the rainy season, increase transaction costs and the time spent travelling.



- Unpredictable supply of maize and price volatility lead to market uncertainties, besides increasing transaction costs.
- Inconsistencies in maize quality due to poor post harvest handling complicates management of maize in store, and increases costs.
- Inadequate investment capital restricts procurement of modern machinery and improved storage facilities.

In summary, the main challenges facing the Uganda's maize industry are: poor quality of maize grain; poor product assembly and transport; and lack of appropriate financing. If the quality issue is not addressed, then the informal trade to the major market, Kenya, will be restricted by EAC Maize Standards. This further implies that maize surpluses may become difficult to sell in the regional market as a whole.

Lack of finance is another issue that affects most of the industry players, including farmers, traders, and millers. Since two maize crops are usually grown per year, farmers need to sell their maize within two months of harvest to be able to pay for inputs for the next planting.

However, neither local traders nor local millers have adequate finance to buy and stock up grain after harvest. Local informal cross border traders depend on the finance from Kenyan traders, while grain millers which supply WFP use their WFP contracts to borrow their working capital.

Section III: Addressing Maize Industry Constraints through Finance

Identifying relationships along the maize value chain, mitigating constraints, exploiting opportunities for value chain finance, and exploring how formal financial institutions can enter the equation, are all vital parts of improving the overall effectiveness and efficiency of the value chain, and the returns enjoyed by value chain participants. Financial services can play a key part in this type of development.

Without access to finance, maize producers get stuck in low investment/low return production cycles. Lack of financing may prevent a producer from planting his or her crop, or reaching the optimal market for his or her maize. Likewise, financial constraints can have negative effects on traders and processors, preventing them from expanding and thus capping the amount of maize they buy from their suppliers.

Demand for Agricultural Finance

As explained in Section II above, maize producers need financing for improved technology and for inputs such as fertilizers, seeds, agro-chemicals, fuel, tools and equipment and labour used to plant, harvest and transport the maize crop to the market. Some growers only need short term working capital, while for others longer term investment funding is important.

Financial services such as deposit facilities (to assist in building up 'own capital') short and longer term loans, letters of guarantee, payments/transfers and leasing can help producers make the investments needed to increase their productivity and profitability.

Similarly, other value chain actors (e.g. agro-processors, buyers/traders and input suppliers) require access to working capital on the one hand, and loans/leases for equipment on the other.

Supply of Agricultural Finance

Buyers and processors often supply growers with funding in return for access to the future crop. This can be through formalized contractual agreements, as described above, or much less formal arrangements, often between growers and small-scale itinerant traders. Indeed, these financial flows between value chain actors often take the form of

in-kind transfers. That is, the lender advances inputs such as fertilizer or seed for payment at a later stage. Frequently the lender takes payment in the form of maize grain. Advances may also take the form of cash, for labour and for living expenses, with repayment in the form of grain. These arrangements do not necessarily involve financial institutions, at least not directly.

On the other hand, linking a financial institution to the value chain can be an effective way of augmenting the volume of finance. Examples of this include warehouse receipt lending or bank lending to a maize producer, based on the producer's relationship with a well-established buyer. When a buyer with a sufficiently strong reputation as a reliable trader is willing to vouch for a producer, even a small producer becomes more attractive to financial institutions as a client.

There are three common types of value chain financing.

i) Trade credit involves short term seasonal loans, generally between maize producers and either input suppliers or produce buyers (processors/millers, traders etc). These relationships between buyers and sellers are often temporary and are price driven. Trade credit allows smallholders to participate in commercial value chains by expanding product sales, both through achieving greater output and by enabling access to more secure market channels.

ii) Contract farming or outgrowers' schemes are relationships in which buyers of agricultural produce may lend funds (either in kind or in cash) to producers as part of a product purchasing agreement. It is often direct financing, but may be complemented by involvement of a financial institution that recognizes the value of the contract between grower and buyer. Contract farming and outgrowers' schemes are formal relationships in which the buyer often provides additional services, such as technical assistance.

These schemes allow producers to gain access to high value markets as well as to increase their productivity by providing credit with embedded services such as technical and marketing assistance.

iii) Warehouse receipt lending: This system is an example of indirect value chain finance that requires a financial institution to complete



the transaction. Warehousing is a beneficial service on its own, allowing producers to sell when market prices are more advantageous. Warehouse receipts issued to depositors, by bonded and certified warehouses, allow producers to use the deposited inventory as collateral for loans, opening the door to finance for collateral-constrained agricultural producers.

Warehouse receipt systems extend sales seasons of grain, while providing farmers access to higher average prices and economies of scale from upgrading the marketing process. It also provides these farmers with an asset that can be used as collateral.

For maize growers, as well as for those involved in producing other forms of agricultural produce, the challenge lies in generating the necessary scale, so as to economically meet the fixed costs of certified, insured and secure warehousing, together with realizing the benefits that bulking brings in the form of attracting buyers and permitting transport economies of scale. The current efforts by some bodies in Uganda to assist in organizing farmers into producer groups are valuable steps towards achieving these goals.

Financial Products Available to Some Borrowers are:

Agricultural production loans: Currently commercial banks operating with rural clients, MDIs and microfinance institutions such as SACCOs provide agricultural production loans. These take the form of seasonal loans for periods ranging from 6 to 12 months, with a grace period equivalent to the crop cycle. It is expected that at the end of the crop cycle the maize producer fully pays off the loan. This has greatly enhanced production in Kapchorwa, Mbale, Kasese and Iganga.

Loan sizes vary from UGX 0.5m to UGX 10m, due to the nature of land holding with average area for commercial maize production ranging from 1 hectare to 10 hectares. Producers are expected to contribute to the cost of production hence greatly reducing loan sizes and easing repayment. Loan availability is heavily restricted. Even those who succeed in borrowing face high interest rates, generally 2.5 to 3 percent per month.

Processing/trading finance: Finance negotiated for the working capital needs of firms buying, transporting and processing maize is mainly in the form of commercial bank loans and overdrafts. The sizes of loans vary with the size of the business and nature of collateral offered by the traders. The normal range is from UGX 5m to UGX 500m. Currently banks and MDIs offer agricultural SME financing, encouraged as they are by GoU policy, backed up by guarantees offered by donor agencies (e.g. by Danida).

Other forms of financing include vehicle and asset financing (leasing) offered by Stanbic, Barclays, DFCU, Centenary and Equity banks. These products have enabled producers and traders to acquire processing equipment and transport vehicles that have enhanced the trade in maize grain.

In rural areas, however, high transaction costs and risks associated with agricultural production keep financial institutions from playing a leading role. As a result the predominant sources of financing for agricultural production are often SACCOs and agribusiness enterprises with direct links to and vested interest in agricultural producers.

Because of supply constraints this means tight availability of finance at the maize production end of the value chain, a situation that hopefully will improve as greater progress is made with farmer group formation, coupled with a growing knowledge, by lenders, of the potential offered for financing investments in the maize industry.

3.5 Dairy Investments by Smallholders ¹



Section 1: The Ugandan Dairy Industry

Milk-producing cows are perhaps the most valued and potentially profitable assets a Ugandan farm family can own. They provide families with a dependable flow of cash, producing income from milk for substantial periods of the year with minimal delay between milk sale and receipt of income. Yet most rural households in Uganda live in poverty in spite of the potential that cattle offer them to earn well-above subsistence income.

Uganda, with a population of 31m people, has an annual GDP of US\$11.8 billion². The agricultural sector accounts for about 42 percent of this, and the livestock industry makes up for 11 percent of Uganda's agricultural GDP. Some 80 percent of the livestock GDP comes from the dairy industry, with an annual value of US\$350m³.

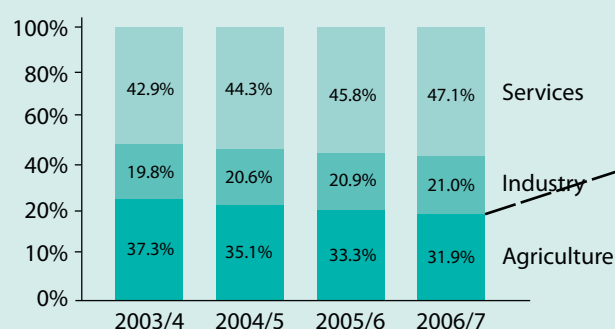
¹ **Author:** William Matovu, East African Dairy Development Project

² Uganda Bureau of Statistics 2007

³ Ministry of Finance, Planning and Economic Development *BACKGROUND TO THE BUDGET 2007 - 2008, DDA, Overview Of The Status Of Uganda's Dairy Industry, EADD Analysis, 2008*

Diagram 1: Breakdown of Uganda GDP

Breakdown of Uganda GDP (by industry)*

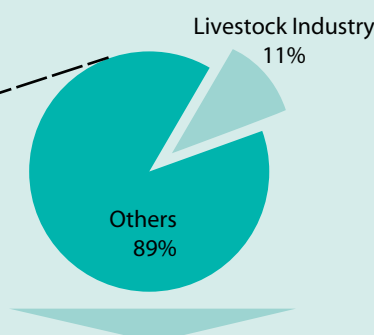


Uganda GDP 2006-2007 US\$11.8 bn

* Monetary + non-monetary

** Dairy Development Authority estimate

Breakdown of Agricultural contribution to Uganda GDP in 2007 (est.)



In 2007 Dairy industry accounted for more than 80% of Livestock added value**
~3% of Uganda GDP (US\$350m)

The recently concluded National Livestock Census estimates that about a quarter of households in Uganda (1.7 million households) own cattle and that the national cattle herd is estimated to be 11.4 million. The overwhelming majority of the cattle-owning households (92.7 percent) own indigenous cows, while only 10 percent of the cattle-owning households own exotic dairy or cross breeds. The total number of milked cows is 1.52 million, producing about 1.85 million litres per day. Of the total milk produced about a third (34.7 percent) is sold, implying that a high proportion is consumed at home⁴.

Individual farm milk production quantities are extremely low, making it difficult to achieve the volume levels required for economically viable activities along the bulking and marketing chain. On average 60-80 percent of milk produced is from small-scale operations of one to five cows. The average national production per cow is estimated at less than two litres per day. Thus, this makes a strong case for smallholders to participate in the dairy sector through the cooperative or group model, if they are to realise any scale economies, and thus profit from dairy farming.

There are twelve milk processing plants and mini dairies, with a combined installed processing capacity of 686,200 litres per day. Details of these are set out in Table 1 below, Milk Processing Plants and Mini Dairies in Uganda, June 2009.

In addition there are many micro or small-scale processors of value-added products particularly yoghurt, ice cream, sour butter, ghee and cheese.

The infrastructure for rural milk collection is poorly developed in most parts of the country, except in the south western region and to a lesser extent in the central region. Some 389 milk coolers with a total capacity of about 591,000 litres are installed in rural areas for milk collection. 75 percent of these are located in south western region and 15 percent in the central region⁵. Only chilled milk is delivered to the processing plants, using milk tankers. There are 92 insulated milk tankers with total capacity at any one time of 462,700 litres. The tankers are used to transport milk from rural areas to processors and to the raw milk markets in the major urban centers.

Most milk in Uganda is sold in the informal market; formal channel distribution accounts for an estimated 9 percent of production (and Uganda is currently utilizing an estimated 45 percent of its installed processing capacity). Losses are also high; in 2007 losses accounted for about 10 percent of total production (implying a value of over US\$23m).

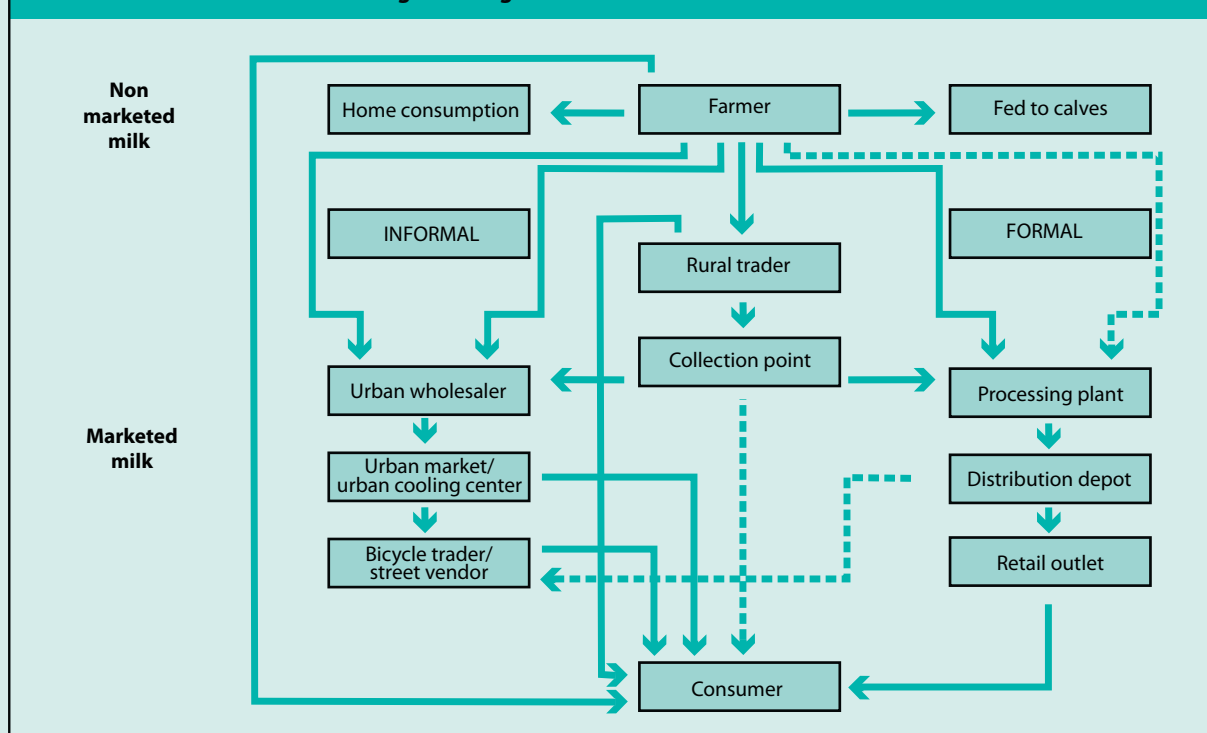
⁴ There is a discrepancy between total marketed milk volumes that are being reported by the Dairy Development Authority and the 2008 Livestock Census. While the census indicates that 34.7% of the total volumes produced are sold, DDA indicates that 70% of the total production is marketed. The reason in the difference could be that while the census considered all regions of the country, DDA figures could mainly have considered milk producing areas. The main point, however, is that there is a need to harmonize the situation so that one authentic figure is reported.

⁵ Dairy Development Authority Report, November 2009

Table 1: Milk Processing Plants and Mini Dairies in Uganda, June 2009.					
	Name Of Company	Location	Installed Capacity (l/day)	Capacity Utilized (l/day) ⁶	Products Made
1	Sameer Agriculture and Livestock Ltd.	Kampala	500,000	250,000	Pasteurized milk, UHT milk, yoghurt, ice cream, butter, ghee.
2	JESA Farm Dairy	Busunju	30,000	24,000	Pasteurized milk, yoghurt, butter, ice cream.
3	White Nile Dairy	Jinja	6,000	3,000	Pasteurized milk, yoghurt, ghee, cream.
4	GBK Dairy Products (U) Ltd	Mbarara	54,000	15,000	UHT milk, ghee, pasteurized milk.
5	DairiBoard (U) Ltd	Mbarara	40,000		Plant not operating at present.
6	Biurunga Dairy	Kisoro	15,000	12,000	UHT milk.
7	Teso Fresh Dairies	Soroti	3,200	800	Pasteurized milk,
8	MADDO Dairies Ltd	Masaka	2,000	800	Pasteurized milk, yoghurt.
9	Gouda Gold	Kampala	15,000		Cheese.
10	Paramount Dairies Ltd	Mbarara	3,000	2,000	Cheese.
11	NIRMA Dairy & Foods Ltd	Entebbe	8,000	2,000	Pasteurized milk, yoghurt, ice cream
12	Napier Dairy	Ntinda	10,000	2,000	Yoghurt, ice cream
	Total		686,200	313,100	

⁶ Note that capacity utilization changes due to the seasonality faced by the industry.

Diagram 2: Uganda's Milk Distribution Channels⁷



The average farm gate price for a litre of milk is estimated at UGX 400/litre, with a processed litre costing about UGX 1,200.

The total quantity of milk and milk products imported has been declining progressively since 2003, replaced by local production. As a result of the decline in the imports, the amount of money spent annually on importing milk and milk products has seen a steady decline from UGX 50.5b in 2001 to UGX 2.3b in 2009. Meanwhile the value of milk and dairy exports went up to nearly UGX 4b.

Overall, the per capita milk consumption is estimated to be 50 litres per annum, which is well below the WHO recommended standard of 200 litres per capita per annum. In general, milk consumption is growing at an average rate estimated at 8 percent per annum, which can be attributed to the growing middle class and the current stable macroeconomic situation within the country. Such a scenario provides confidence to smallholder farmers to continue investing in the dairy sector.

Section 2: The Typical Dairy Smallholder

Most Ugandan dairy farmers utilise existing, inherited land, and communal grazing areas, though some have been able to acquire land specifically for their dairy enterprise. If land is acquired for this enterprise the cost on average in a rural setting ranges from US\$200 - US\$1,000 per acre.

Similarly, the more ambitious farmers have moved away from local breeds such as Ankole and Zebu, to crosses of these breeds with exotic cattle such as Holstein Friesian; Jersey, Guernsey, Brown Swiss & Ayrshire, and even to pure exotics. Indeed, the Holstein Friesian is preferred, for its high average yield. When buying, farmers favour in-calf heifers that on average cost US\$750, including freight.

The choice to start commercial (or emergent-commercial) dairying is determined a lot by the existing extension services in the locality and also by the government and non-government projects like Heifer Project International. The first task is to ensure a food supply for the cows. Establishing a fodder field entails expenditure of US\$50 -100 on seed, and a similar amount on labour, unless family workers are used.

⁷ Source: The Uganda Dairy Value Chain Study by the East Africa Dairy Development Project (EADD)



Life in the home starts to change as soon as the dairy stock comes in. Initially the farmers start with a few items of milking equipment like a milking bucket and a can before they gradually acquire more of these items for convenience.

Acquisition of dairy equipment initially calls for an investment of US\$50, but as the stock and dairy business grow, so more items are needed. A bicycle is handy for the dairy farmer to transport his milk to the market. The majority of dairy farmers have a milk collection point to which they deliver their milk on a daily basis. Payment is usually weekly or fortnightly. Other farmers use a bicycle to hawk their milk within their immediate vicinity.

After calving, and when the cow comes into season, artificial insemination (AI) services are used by some, but often a bull has to be on hand because of the high cost of AI in some areas, the scarcity of liquid nitrogen to preserve the semen, or repeated heats when artificial insemination fails to produce a pregnancy.

Tick and worm control, and required vaccinations against cattle diseases, are essential parts of dairy cow management. Weekly tick control costs an average of US\$0.39 per cow per week, while control of worms is a quarterly chore, at a cost of US\$3

Table 2: Semi-grazing farmer: Profitability Analysis

	No. of cows	Daily Income per household member - UGX					
Price per litre - UGX		250	300	350	400	450	500
	5	(540)	(140)	340	760	1,200	1,640
	10	900	1,780	2,640	3,500	4,380	5,240
	15	2,340	3,640	4,940	6,260	7,560	8,860
	20	3,880	5,620	7,360	9,100	10,820	12,560
	30	6,960	9,560	12,160	14,780	17,380	19,980

per cow. The required veterinary products can be purchased over the counter, and farmers can be trained to carry out the treatment themselves. Annual vaccination costs about US\$10 per cow.

As a result of the costs and returns noted earlier in this article, a semi-grazing farmer needs about 10 cows to earn a daily income of 1 dollar a day per household member. (Also see Table 2 above)

Section 3: Dairy Industry Problems, with Financial and other Solutions

To profitably engage in dairy farming, smallholder dairy farmers can usefully exploit opportunities for group or cooperative approaches to milk production, bulking, packaging and marketing. These also provide an opportunity for smallholder farmers to get access to quality inputs at reduced costs.

Table 3: Variable Costs for Smallholder with 5 Milking Cows

Item	Quantity	Frequency	Unit Price UGX	Total UGX
Temporary shelter / fencing	1	1	500,000	500,000
Veterinary treatments & extension	5	12	5,000	300,000
Water	400	365	2	292,000
Feeding	5	365	1,000	1,825,000
Labour	1	12	30,000	360,000
Total				3,277,000

To amplify the above point an example is given below. Here gross margin analysis is used to determine farm revenue as a measure of economic performance of dairy farming, providing variable cost breakdowns. Estimated costs include costs of feed, animal health services, labour, housing and water. Since gross margin analysis involves variable costs only, it excludes fixed costs such as land under pasture either owned or rented. Hence, investment costs such as cost of purchased animals are not included.

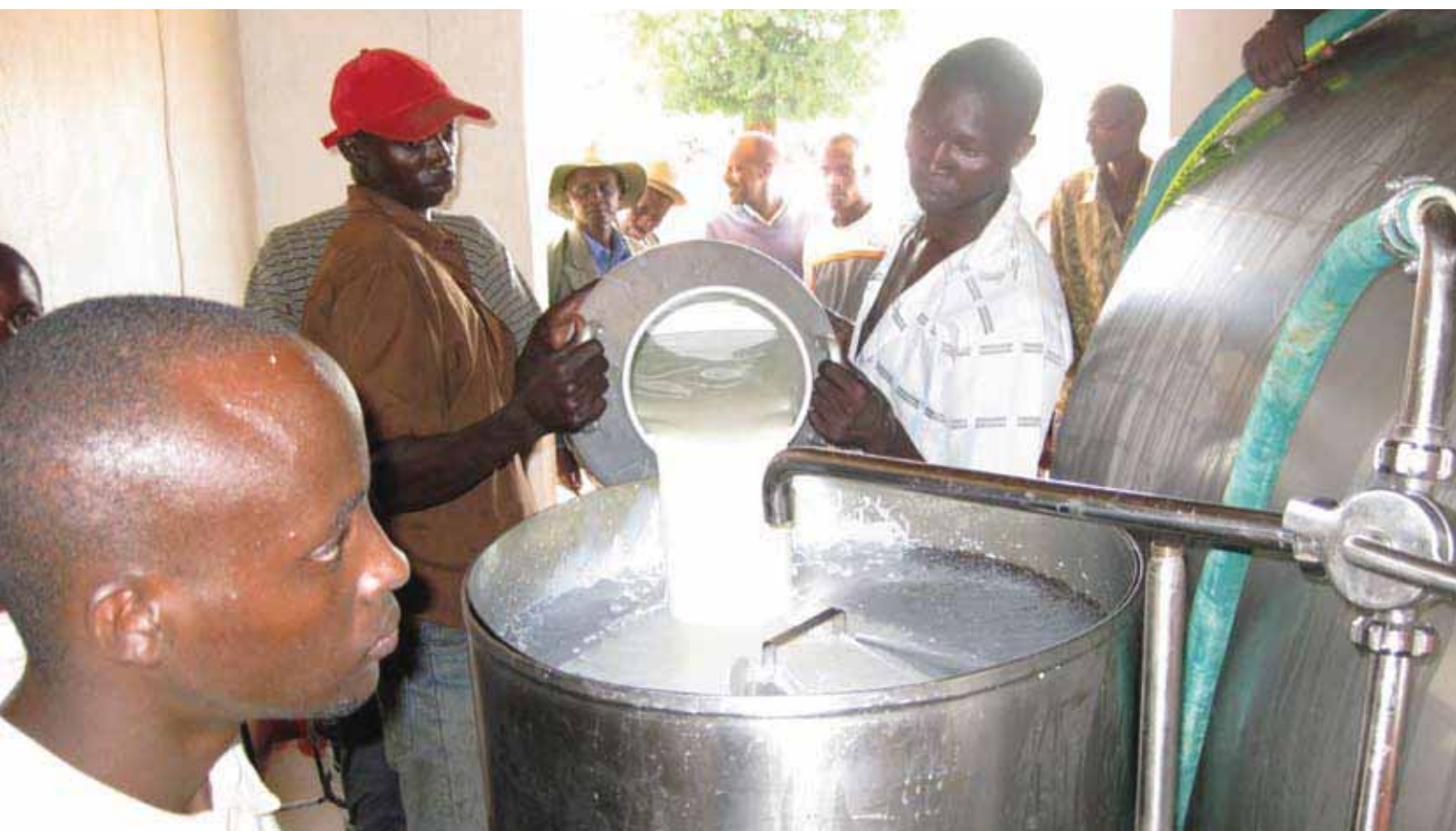
The example is of a Mr. Mukasa, from Wakiso District. He is a smallholder with five cross-bred cows. His variable costs are given in the tabulation above – Table 3.

Assuming each animal is able to produce an average of 10 litres per day (for 305 days lactation) and he sells each litre at 350 shilling then he will be able to get a gross income of UGX 5.3m hence making an annual gross margin of UGX 2m.

However the approach is currently faced with quite a number of challenges:

1. Cooperative history: The failed cooperative system in Uganda is still fresh in peoples' minds. This chequered history of co-operatives has left many farmers skeptical about collective action and investment. To make matter worse, a number of fraudsters have gone around rural areas, mobilizing local people to work through groups, but end up reaping them of their hard earned shillings.

2. Management/governance weaknesses: The sector lacks the experienced managers needed to support the smallholder groups to profitably manage their enterprises. Much training and mentoring is needed. Also, in many cases, corporate governance is an issue with such groups or cooperatives.



3. Negative side of liberalization: The sector was liberalized and thus many raw milk traders entered the market to trade in raw milk. While this was good in the way of ensuring that farmer's milk was being bought, the farmer is still getting low prices. Or sometimes raw milk traders take farmers' milk and report back to farmers that it got spoilt. Such trends are discouraging smallholder farmers from investing in the dairy sector or even to join dairy groups. In fact there are many reports of farmers who have sold off their dairy animals, arguing that the enterprise is no longer profitable.

4. Limited access to financial services: Access to sustainable financial services is a constraint to on-farm production increases, maintenance of milk quality, efficient milk bulking and transport to markets. Most financial institutions if not all are hesitant to finance agricultural projects, whether operated by individual farmers or by groups. For the dairy sector to succeed, mechanization is needed at all levels of the value chain i.e. at farm level, bulking and at processor level. At farm level farmers want feed chopping equipment like chaff cutters and fodder choppers. They also need milk

cans, simple milking equipment and veterinary supplies, quite apart from the wish to continually improve the breed of their stock. Most smallholder farmers do not have the ready means to make these investments. At group level, smallholder farmers need milk coolers, testing equipment and suitable storage that they can use for bulking milk, maintaining good milk quality and thus increasing the shelf life before marketing.

Experience from EADD indicates that to establish such a bulking centre i.e. for a 5,000 litre capacity, requires about US\$40,000. For some lucky farmers groups, donor projects or NGOs are supporting access to the cooling units. More substantial investments are required for milk tankers and dairy processing equipment.

Development projects such as EADD have demonstrated that smallholder farmer groups can profitably engage in the dairy value chain. A classical example is the Kiboga West Dairy cooperative located in Kyakwanzi Sub-County in Kiboga District. With the help of EADD this farmers' group was organized in September 2008. The group

started with 100 members and was supported to register as a cooperative. EADD enabled the coop to draw up a business plan for establishing a 5,000 litre capacity collection centre. The project required the coop members to mobilize 10 percent of the total equity needed to invest in the business. The project also supported the coop in mobilizing both this 10 percent and also additional members. EADD then pre-financed the investment with 90 percent equity. The chilling plant thus established will lead to the creation of a hub of services that smallholder farmers need in order to profitably engage in dairy production. The dairy hub will serve as a community anchor for industry knowledge, business services and market access.

Fully functioning, the dairy hub is a dynamic cluster of services and activities that generate greater income for dairy farmers. Through the hubs, the quality of milk passing through the raw milk market will be improved and access to formal markets will be facilitated through farmer owned-and-operated chilling plants.

In Kyakwanzi the cooperative started bulking milk in April 2009. By then a litre of milk was being bought by raw milk traders for UGX 200. Because of the introduction of the chilling plant farmers are now currently enjoying a price of UGX 350 in a flush season and about UGX 500 in a dry season. Smallholder farmers are now assured of sustainable access to markets throughout the year, which was not the case before. Income generated by the Kiboga West Livestock Cooperative Society Limited located in Kyakwanzi, Kiboga district, is shared among 629 supplying farmers. Milk is sold to Sameer Agriculture and Livestock Limited (SALL).

Section 4: Promising Ways to Improve Financial Services for the Dairy Industry

Dairy farmers utilise both local SACCOs and banks for savings deposit services. The extent to which these are used is not known.

Loans to support investment come from many sources. Within the value chain there is some assistance with investment. For example, the dairy processor Sameer provides milk cans to farmers (those organized in groups and selling milk to Sameer) on credit and they pay in installments.

Generally financial institutions in Uganda are hesitant to finance small holder farmers. While some

financial institutions like ECLOF, and Centenary Bank have designed products that target farmers, the intended clientele are either ignorant of these services or they find the conditions unsuitable and unattractive - especially the interest rates and short term tenor of the loans offered.

To move forward, a number of approaches are suggested that can motivate financial institutions to support dairy farmers in Uganda.

1. Contract farming: As noted, many processors are producing under capacity due to lack of enough milk. The sector has to face problems of seasonality and this causes fluctuating farmer gate and retail prices. To ensure steady supply of raw material throughout the year, it will be strategic for processors to introduce contract farming. This would enable processors to be assured of an adequate supply for their plants. Apart from providing milk cans to farmers, they may consider assisting with finance for upgrading herds in terms of breed, as well as with other on-farm investments. Repayment will be automatic deduction from milk payments.

2. Hub formation: EADD (East African Dairy Development Project – funded by the Gates Foundation) has designed a hub model that focuses the services to dairy farmers around a central facility or hub. Hubs can effectively connect rural farmers with business services, industry knowledge and, most critically, to formal and to improved traditional markets. A chilling-plant hub typically starts with 500 farmers, but can grow to some 5,000 farmers. They are organized as a single dairy farmer business association (DFBA). A DFBA is a legally registered or recognized organization, formed for the purpose of building and operating a chilling plant or major milk collection centre, and/or developing the associated hub services. It is estimated that a minimum throughput of 5,000 litres per day is needed to be self-sustaining and profitable.

Milk cooling using the chilling plant is essential for formal market access by dairying smallholders, as their geographic location does not permit them to sell milk in major markets without bulking, cooling and transportation. Without a chilling plant, farmers have the traditional market as their only option for milk sales, limiting their distribution to neighbours or markets within a two-hour or 60 kilometer radius—the typical range in which un-chilled milk can travel without spoilage.



To be efficient and profitable, chilling plant operations require the DFBA and plant management to have business management skills. These two management teams set and maintain milk quality standards that are largely absent or not enforced at the national level. Raising the quality standards of milk will determine the potential for the country's dairy industries to establish viable national and international markets. Investors in new processing operations can only develop value-added products if quality milk is available.

As the market agent, the plant management must develop skills in negotiating with processors and meeting supply contracts. Using information and communication systems, management can serve farmers with relevant market information. The chilling-plant hub includes dairy enterprise inputs, commercial and financial services required for farmers to grow their business. These business development services (BDS) are attracted or developed by training providers in small-business delivery and management, and by educating farmers in the business advantages of using these services. Service providers may include breeders

and artificial inseminators, agro-vet shops and community animal health providers, feed suppliers, credit and financial institutions, and savings and money management services. Using a BDS model improves service delivery and generates income for the individual farmer, cooperative and service supplier. As a sustainable approach, the hub develops the service sector, promoting commercial transactions between service providers and farmers.

In the baseline survey conducted by EADD in 2008, 253 Ugandan smallholder dairy farmers were interviewed on their borrowing history. Among this group only three had obtained a long term loan for dairy activities, while four indicated that they received finance from projects/NGOs and only one received credit from a microfinance institution. This gives some indication of the extent to which financial institutions are not financing smallholder dairy enterprises.

Though not a lot of work has been done on the loan amounts and loan tenors for which there is effective demand within the industry, based on the costings

in Table 3 (variable costs) and the fixed costs which smallholder farmers face in dairying, loan amounts may range between \$2,760 to \$6,935, for between one and two years. This is for a 1-5 dairy animals smallholder who basically is just starting up dairying. Most times, smallholders just need a real incentive to invest more from their own resources, thus reducing their borrowing needs.

On the other hand smallholders in their associations/cooperatives/groups also desire to invest in milk collection centers. Based on the business plans EADD has been formulating for various farmers' groups, loan amounts to establish standard milk collection centres range between \$32,368 to \$134,210, and the repayment period runs between 4 to 6 years. EADD experience working with these farmer groups indicates that running a milk bulking centre is a profitable enterprise and thus farmer groups can ably pay back in time if the centre is well managed.

In conclusion, financing difficulties for dairy ventures is a major barrier to growth. Addressing this issue is critical to the success of the industry. In Uganda, farmers face interest rates of 25 to 30 percent, representing a substantial barrier to industry growth.

There is ample evidence to suggest that smallholder dairy producers are competitive generally. In this respect:

- Evidence shows that smallholder producers remain viable, particularly when opportunity costs of labour are low.
- Land holding size is demonstrated to not generally form a barrier to smallholder entry into dairying, due to access to fodder cut from public areas or supplied by the market.
- There are few economies of scale in milk production in Uganda. Although large scale producers show higher levels of returns overall, unit profitability in milk production is not significantly different between large and small producers.
- Infrastructure remains a major constraint to smallholder market participation, particularly poor-quality feeder roads

Note should be taken that dairy income consists of revenues from selling milk, cattle, manure and feeds, together with the imputed value of milk consumed on-farm. Properly managed, the income streams from dairying are a good foundation for dairy smallholders to be satisfactory borrowers from financial institutions.



Chapter Four
***Regulated
Institutions***

4.1 Impact of Leasing on Uganda's Farm Machinery Stock¹



Section 1: Machinery in Ugandan Farming

Uganda is largely an agricultural country with over 70 percent of the population engaged in and deriving their source of livelihood from agriculture. However, due to the fact that subsistence cultivation continues to form the biggest percentage of agricultural activities, there is a relatively low usage of machinery in farming. This is because most farmers engage largely in food crop production for their own consumption, and their scale of operations is small. Some of the minority of farmers involved in the production of cash crops such as cotton, sugarcane, cotton, sunflower etc. cultivate larger areas, and are therefore likely to want to use machinery, especially for cultivation.

Another reason for the relatively low usage of machinery is the unavailability of appropriate credit facilities for its acquisition. Most lenders and leasing companies shy away from the agricultural sector due to its perceived high risk and the uncertain cash flows associated with its products. A further

disincentive is that farmers usually lack proper records and are often disadvantaged when taking on the management challenges of coping with new technology. Moreover they generally have a poor or no credit history.

In a bid to promote the use of agricultural machinery, the government introduced fiscal measures such as exemption of VAT and import duty on agricultural equipment, so as to subsidize the price. Government also recently amended the VAT Act to give exemption on lease rentals in respect to such equipment. This measure was targeted at further subsidizing the cost of leasing. This has had the effect of reducing the monthly payments (rentals) by the value of the VAT (18 percent) thus making leasing of such equipment more attractive to lessees.

Additional fiscal incentives, aimed at encouraging banks to lend to the agricultural sector, were introduced by the government some years ago. They have been described, and their effectiveness evaluated in the Yearbooks for 2007 and 2008 respectively.

¹ Author: Joseph Ndiho, East African Development Bank, Kampala.

Government's initiative of promoting the growth of the microfinance industry was further aimed at improving access to credit facilities at the rural level where the majority of the farmers are located. A partnership between NAADS and the Microfinance Support Center Ltd. to enable progressive farmers to access finance is now in place, although the amounts available, structures of the facilities and the conditionality of accessing the facilities have continued to be a deterrent factor in their use to acquire machinery. In some cases, NAADS has supported agro processing by directly providing milk coolers, rice hullers, maize mills and honey equipment².

However, none of these initiatives appear to have had much influence on improving the availability of farm machinery, largely because the sector is viewed by financial institutions as highly risky, with volatile product prices and uncertain cashflow patterns. The farming population is by and large not yet properly organized to attract funding from the existing leasing financial institutions and microfinance institutions. Most of the latter continue to focus their lending on loans to finance local trade. The lack of sophistication in Ugandan farming methods, with minimal use of improved inputs, reliance on natural weather patterns, and poor agronomic practices all add up to the fact that a financial institution cannot easily predict the cash flow patterns from farming, thus making lending or leasing to farmers very difficult.

If the country is to succeed in improving investment in agricultural machinery, a conducive environment should be provided that addresses an "end to end" process. All participants need to be involved and have their respective interests acknowledged. This includes farmers, the financial institutions that provide the financing and the suppliers of agricultural machinery.

Policy makers should aim at creating a funding mechanism that is different from the traditional banking products to stimulate investment in machinery needed to build productivity in agricultural value chains. A start has already been made in this direction. The recent introduction by GoU of the agricultural credit scheme is enticing banks to lend to agriculture at a more attractive interest rate than is usually applied. This is a welcome move by government, but it is not without its limitations. The participating institutions have been told to use their usual rigorous criteria to determine qualifying borrowers and yet the majority of the

would be beneficiaries are the ordinary farmers who are poorly organized, with limited credit history, poor record keeping skills and lack of well defined existing cash flow³.

It is also not clear how SACCOs, on which so many farmers are dependent for financial services, could embark on lending or leasing for machinery purchase, except through a linkage programme with commercial banks, or other financial institutions able to enter into longer term advances. In addition, much training of SACCO staff, managers and directors would be needed if this were to come about.

Machinery at present is overly expensive. Any dealer willing to aggressively cut costs and profit margins could be expected to be in a position to gain substantial market share, and an important foothold in an emerging market, where brand loyalty as regards machinery is very strong. Even a degree of local assembly, if this leads to lower prices, might be an interesting way forward.

The farmers who are the end users of the equipment and finance need to be trained and given some good financial and business management skills so as to be able to attract the lenders. The current intervention by the NAADS and other programs has its limitations of outreach and effectiveness. Clearly a boost in the whole area of rural financial literacy is required. It is pleasing that efforts are starting to be made in this direction in Uganda, though all concerned would acknowledge that there is a long way to go before this approach will reap dividends – especially in the area of machinery leases.

Section 2: Servicing and Repair Facilities

There are hardly any major servicing and repair facilities for agricultural equipment in the major farming areas in the country. The suppliers of agricultural equipment and machinery are mainly located in urban areas, specifically Kampala. They offer mobile maintenance and service facilities as and when required. Some of them also have what might be termed 'pseudo representation' in some major towns in the country like Mbale, Mbarara, Arua, Lira, Kasese. This is largely because the low levels of machinery use in the different farming areas making it uneconomic to set up shop in remote places. The major users of equipment are estates involved in sugarcane and tea production,

² Background to the Budget 2009, 66

³ The current situation with the Government's Agricultural Credit Facility is covered in this Yearbook in Article 1.3.



which for the most part have in-house workshops, save for when highly specialized equipment is needed, in which cases they are obliged to call for external help.

The lack of adequate service and repair facilities in farming areas poses challenges to potential lessors, as well as to lessees. It is costly to send qualified technicians out from the Kampala-based authorized agents of machinery manufacturers. Consequently, and in a bid to conserve cash and reduce expenses, the users of the equipment tend to ignore the service schedules of the equipment or even improvise by using non-qualified service personnel. These moves eventually reduce the mechanical effectiveness of the machinery.

It is worth noting that if the equipment is leased, then it forms the primary security of the transaction. The lessor therefore has an interest in the machinery maintaining its value over the life of the lease. The absence of a proper service and maintenance schedule erodes the value of the equipment, which makes it unattractive for lessors to deal with clients and machinery that carry this risk.

The existing service and repair shops of agricultural equipment/machinery are mainly offered by the authorized equipment agents and vendors who have the requisite equipment and skills. Smaller equipment items, such as maize and rice hullers, threshers, and some walking tractors (power tillers) are sold by vendors and/or fabricators many of whom do not have good after-sales service points.

There is definitely a potential investment opportunity for leasing institutions to finance the acquisition of machinery and equipment by competent workshop operators, in rural towns. This appears to be an opportunity-in-waiting. Some poorly equipped workshops exist, servicing a wide range of makes and models of farm machinery. Their effectiveness would be significantly increased if they were to have access to proper workshop equipment.

It is worth noting that the proliferation of mobile phone transmitting masts throughout Uganda has led to diesel mechanics being based in many rural

areas of the country, in order that the telephone companies' diesel-powered generators can be kept running reliably. It is known that these mechanics sometimes service tractors, as and when they have time to do so. It will be interesting to see how this pragmatic solution to a locational skills shortage develops over time.

Since there are now agricultural zones in the country, where specific agricultural production is being encouraged, a situation may exist where a concentration of a particular type of enterprise leads to a significant scale of demand for machinery for such an enterprise type. In turn this could warrant commercial provision of appropriate service and repair facilities, and may also lead to banks offering leasing products to assist with financing the necessary investments.

Some voices may call for subsidies to encourage equipment vendors to set up shop upcountry, so as to reduce the costs incurred by the farmers. This is not recommended here, despite the recognition that this would encourage a good maintenance and repair schedule, which would preserve equipment value and in turn attract leasing institutions to finance more agricultural equipment. Rather it is suggested that public sector investments in terms of roading, power supply and communications are appropriate interventions, as these have the merit of benefiting farmers directly, as well as all firms operating in rural areas – including those specializing in the service and repair of agricultural machinery.

Section 3: Impact of the Introduction of Leasing⁴

The introduction of leasing as an alternative method of financing from traditional loan products, whereby the leasing institution (Lessor) purchases and retains title to the equipment but rents it out to the client (Lessee) for an agreed payment sum over a definite time period, has changed the spectrum of equipment acquisition in the agricultural sector, especially for engine-powered machinery. With traditional loan products, the emphasis was put on having collateral in the balance sheet with a higher value than the equipment being purchased. This had the effect of negating the value of the machinery in the financing equation.

Leasing however does not necessarily require a lessee to have additional collateral since the

equipment being financed is the primary security in the transaction. Leasing also changes the focus from the balance sheet to the actual and projected cashflow of the client. This has the important benefit to the lessee of enabling the use of balance sheet collateral for borrowing working capital.

The advantages conveyed by lease financing have been instrumental in enabling acquisition of agricultural machinery in the country. An interview with the major lease financing providers such as Stanbic Bank, East African Development Bank, DFCU Bank attests to the growing portion of agricultural equipment in their portfolios, albeit not at the rate that it would have been had the sector not been still viewed as highly risky.

Most leasing houses have a number of partnership schemes with the major equipment suppliers such as Farm Engineering Industries Ltd, Cooper Motor Corporation, Engineering Solutions (U) Ltd, and Heavy Duty and Farming Equipment Ltd. These arrangements have improved the sales from the suppliers' points of view and have ultimately led to better liaison between supplier, financier and lessee. It is expected that the recently introduced agricultural credit scheme by the government will further help in the financing of agricultural machinery.

The introduction of micro-leasing products by Uganda Microfinance Ltd. (now Equity Bank) and Centenary Bank has had a huge impact at the grass roots level by enabling acquisition of machinery for their particular clientele, many of whom are farmers. Significant numbers of clients at the microfinance level are faced with the common challenges of lack of collateral, together with disappointment, when in a group borrowing situation, of having been let down by some group members. With micro leasing individuals are able to access funding for equipment costing as little as UGX 1.0m with a payment period of up to two years⁵. This flexibility allows the lessees fit the repayments within their cash flow patterns.

If the use of agricultural machinery is well embraced in the northern part of the country, there is potential for it to substantially contribute to the food basket of Uganda. There are vast areas of arable land that have not been under any agricultural activity for the last 20 years, due to the LRA war, and this is complemented by the terrain, which is more suitable for mechanization than the land in Western Districts, where the topography is more rugged. Moreover, parts of the country other than the

⁴ "An introductory account of leasing in Uganda", by Andrew Obara was published as Article 1.6 in the 2008 Yearbook.

⁵ Lease Link, Issue 5; January – June 2007, pg 7

North and East have experienced widespread land fragmentation, which is not conducive to efficient mechanization.

For the North to adopt to use of agricultural machinery, there are issues of land ownership that must be settled. Until this is done, in any given case, lessors will be reluctant to enter into leasing arrangements for agricultural machinery.

Once land access is assured, the north of Uganda is well-suited to contract production of certain broad acre crops, such as oilseeds, sesame (simsim) as well as the traditional crop for the area - cotton. This is not the place to detail the benefits and pitfalls of contract production. Suffice it to note that a grower in a contract relationship, covering marketing of his output, is in a favourable situation as a potential lease client of a bank.

Access to cultivation machinery can also be gained as part of a contract supply situation when the buyer/processor supplies cultivation services from

If a comparison is made between the commercial rate of 19 percent p.a. and the lending under the agricultural credit scheme offered at 10 percent p.a. it is very clear that the reduced interest cost will bring substantial savings to the farmers. The per million figures in table 1 can be applied to any sort of agricultural equipment, as long as it can be financed over the same period at the same interest rate. It is this flexibility of repayment structures that makes leasing attractive, especially to the agricultural sector, where cash flows follow the crop growth pattern.

The lease payments for a leased machine commence only after its delivery to the farmer, thus ensuring value for money. This is in contrast with acquisition via loan, where repayment would commence immediately, disregarding the breathing space required during the procurement process. In effect, the leasing option offers a grace period up to the point of delivery of the equipment to the farmer.

Table 1: Repayment per million UGX value of lease

Interest rate	Monthly	Quarterly	3 times a year	Semi annually
19%	25,941	78,550	105,217	159,266
10%	21,247	64,147	85,799	129,505

a tractor pool set up for this purpose. Dunavent Cotton used to operate a partial contract system in the north, along these lines, with growers of organic cotton.

Section 4: Typical Leasing Conditions

A typical lease facility of a brand new 60 h.p. tractor, costing approx. UGX 42m, requires an initial deposit of 10 percent (UGX 4.2m) and the balance of UGX 37.8m is paid over a period of up to five years, which is well within the expected lifespan of a well-maintained machine⁶.

Using a market interest rate of 19 percent p.a, the repayments can be structured monthly at UGX 26,205.41 per million of the initial value of the leased item. i.e. for UGX 37.8m being; $37.8 \times 25,940.5 =$ UGX 980,532. Payments can also be made quarterly at UGX 78,550.47 per million (2,969,208) or payment three times a year at UGX 105,216.97 i.e. (3,977,202). Repayment can even be structured semi-annually depending on the cash flows of the client.

Just like any other credit facility, it is important to have a well defined borrower when extending a lease facility. Groups of individuals, arranged in legally defined associations or organizations, may qualify for leasing as long as they are creditworthy. The main challenges faced while lending to groups include the lack of a proper legal definition, poor organization structures, lack of proper corporate governance, poor record keeping and ultimately having no one person responsible for the facility. This makes leases to groups somewhat risky.

There are however cases of properly constituted farmers' organizations, for example in Kapchorwa, where a group of farmers has obtained machinery through a leasing arrangement. Similarly, despite the factory-owned nucleus estates having tractors, some sugar and tea estate outgrower groups have accessed machinery on leases from a major commercial bank. This has been made possible by their secure market together with solid organizational structures.

⁶ A well maintained tractor should give at least 10,000 hours of service. Typical annual usage is some 1,000 hours, giving a life of ten years. Averages over Africa tend to be lower than this, reflecting, perhaps, lack of correct servicing and repair facilities.

Section 5: Importance to the Lessor of a Remunerative Market for the Lessee's Produce

In proposing solutions to the agricultural sector, it has been common to address one end of the value chain mainly the production side. This sometimes has had disastrous effects by encouraging farmers to produce certain crops without an assurance of markets for their products.

This was very evident in recent times with the production of Aloe Vera, and vanilla. Farmers were rallied to produce these crops when the market uncertainties involved were not appreciated—neither by farmers nor by those who offered advice. This left a lot of growers very frustrated.

It is important to note that if agricultural machinery/equipment is acquired for production, but the produce has no secure market, the farmer's ability to pay may be greatly impaired. Likewise a processing plant which is not well fed with raw materials because on-farm production is insufficient will have problems in meeting payments on machinery acquired through leases or loans.

Therefore, financial institutions need access to market information in order that they might effectively appraise lease and loan applications from actors in agricultural value chains.

Armed with this information, leasing institutions will be well placed to support productive and profitable investments along value chains, through production, post-harvest handling, marketing and processing, plus transporting the finished or semi-finished products to the final market.



Chapter Five
Tier 4
Performance

5.1 Has Kyamuhunga SACCO Continued to Shine?¹



(This article is a follow up to an account of this SACCO's agricultural lending, published in the 2008 Agricultural Finance Year Book.)

Introduction

The 2008 Agricultural Finance Yearbook article about the fairly successful agricultural lending by Kyamuhunga Peoples' Savings and Credit Cooperative Society (KYAPS), located at Butare in Bushenyi district, raised both positive and curious reactions amongst a cross section of readers. The positive reactions were accolades of the SACCO's efforts and successes in financing agriculture.

The curiosity evolved on how a small rural SACCO with limited financial, human and other resources could successfully negotiate the risky route where the bigger and better established financial institutions have for a long time opted either to go slow or not to venture at all. Also many readers thought that the success was due to the then support of donor programs and that thus it would not be sustainable once such support declined or terminated. A further view was that the KYAPS story was by default of the SACCO benefiting from the cradle of a rich tea growing geography.

At the time of writing the 2008 article most of the concerns raised by the curious readers, in the preceding paragraph, would have had some merit. KYAPS had indeed just introduced formal agricultural lending, was a beneficiary of several donor programs and had particularly focused on financing tea, albeit with no specific financial product for this enterprise.

However, KYAPS has continued to reshape its strategy to finance agriculture, whether the above factors obtain or not. To the SACCO, financing agriculture is no longer an option but a core and integral ingredient of its portfolio mix if the institution is to stay the course of its mission, maintain its existence and grow. Indeed, the principal activity of its membership is agriculture.

The location of KYAPS certainly gives it no special competitive advantage for non-agricultural financing. In addition, the rules of the agricultural financing game are now well understood by the SACCO. It has trained loans officers and sensitised the management and board. It has gained reasonable access to loanable funds and enjoys a sustainable, effective demand for agricultural credit. Naturally, there is still room for improvement in all these areas, but the snapshot of KYAPS, one year on, is basically positive.

¹ Author: Asaph Besigye, Inspired Associates (Uganda) Ltd

This article sets to provide an update of the agricultural finance activity by KYAPS during 2009 and to also provide insight on the very relevant concerns and comments raised on the 2008 Yearbook article.

History of Agricultural Lending by KYAPS

KYAPS' mission, since its inception, is to provide high quality financial products and services that meet members' needs. However, for a long time, realisation of this mission in regard to meeting the needs of its predominantly agriculturally-engaged membership had remained elusive and thus a

The range of financial products had a varied impact on both KYAPS and its borrowing members. Since non-agricultural loans were offered on more favourable terms, many borrowers diverted the non-agricultural loans into financing agricultural activities. Since the loans were not tailored to the investments to which they were applied, the arrears were high. Other effects (and also causes) were: negatively tinted membership engagement with the SACCO, poor performance of loan officers in particular and SACCO management in general and very high loan portfolio at risk (PAR) figures, especially during off-marketing periods for agricultural produce. The image of the SACCO was certainly not very impressive.

TABLE 1: KYAPS Loan Products in 2004

Loan Product	Interest Rate (%)	Loan Term (Months)
Agricultural loans	5	6
Business loans	3.5	24
Solar loans	2.5	24
School fees loans	3	3
Rainwater loans	3	24
Boda boda loans	3.5	24
Overdraft facilities	5	1

challenge for the SACCO. The members' needs to finance agribusinesses (especially production) required loans with grace periods and repayments that match the activity cash flows, but the SACCO lacked the financial capacity to efficiently and successfully match this requirement. Not only was its savings portfolio still very low, but also access to externally-sourced loanable funds was not possible. At the board and management levels, agricultural lending was perceived to be very risky and efforts were made to keep the agricultural loan portfolio, for the then SACCO's two loosely defined generic agricultural loan products for input purchase especially for tea and for produce transportation, at as low a level as possible. Indeed, by 2004 agricultural loans constituted less than 20 percent of the total outstanding loans.

The agricultural loans provided by KYAPS up to 2004 had no grace periods, attracted higher interest rates, concentrated on very few commodity value chains and were of very short tenure compared to other loans. They were thus not in tandem with the priorities and capacities of the borrowers and were largely shunned by clients. Further, the SACCO lacked staff with appropriate skills to properly manage agricultural lending. Table 1 shows the loan products provided by KYAPS in 2004 and their terms.

Perhaps the most serious result of the unsuitability of the loan product range was that members who had genuine agricultural investment opportunities failed to get them financed because of the inappropriate loan terms. As a consequence they perceived their membership of KYAPS as being of only nominal consequence.

Agricultural Lending by KYAPS Since 2004

The lending situation at KYAPS by 2004 was a cross-road for the SACCO. Addressing the problem involved making risky and innovative decisions. Lending for agriculture was no longer an option but a "necessary evil" to embrace, lest the SACCO risked losing many of its members whose continuous feeling was that it could not meet their priorities and needs.

To this end KYAPS had to surmount the challenges of:

- restructuring the agricultural loan products to improve their appropriateness and broaden their outreach;

- b) accessing external funds to allow flexibility for loan grace periods and structured repayments matching activity cash flows demanded by borrowers;
- c) strengthen skills to adequately manage agricultural lending

agricultural lending that has up to date not only shown a sustainable growth trend, but has also elevated and boosted the SACCO's image.

Though the SACCO theoretically maintained the same product range and terms in 2009 and has also remained open to consider other agribusiness investments such as piggery and agro-processing, it actually faced difficulties with the Uganda Revenue

Table 2: Agricultural loans provided by KYAPS as at end of 2008		
Product	Interest Rate (%) ²	Loan Term (Months)
Tea growing and rehabilitation	2.5	24
Kyera okole (Green leaf tea)	2.5	0.5
Poultry and Bee keeping	2.5	24
Banana growing and rehabilitation	2.5	24
Pineapple growing and rehabilitation	2.5	24
Cotton growing	2.5	10
Cattle rearing	2.5	24

Several factors were involved in the turn round. These included: technical and financial support accessed from the Rural SPEED project for agricultural loan product development, outreach capacity enhancement, skills strengthening at both management and board levels and membership sensitisation; the proactive technical support and increased levels of loan funds by MSCL; and the valuable agricultural lending mentoring of a KYAPS loans officer by Centenary bank (brokered by Rural SPEED). The appropriateness of the new agricultural loan product, though basically a generic one, and the complementary skills enhancement provided the necessary springboard for the roll out of proper

Authority that refused to recognise some of the products, specifically cattle rearing and green leaf tea purchase and transport, as agricultural loans, but rather has discretionally considered them as business loans for taxation purposes. This forced the SACCO to revert to the omnibus classification of its agribusiness loans as general agricultural loans and thus maintaining one loan product for agriculture. To the SACCO this has been a draw back as it diminishes its capacity to efficiently monitor the performance of the various agribusinesses and also to allocate its resources rationally and profitably.

Table 3: KYAPS performances as at December 2008 and 2009		
Item	Status	
	December 2008	December 2009
Total number of savers/members	8,002	9,521
Number of agricultural savers	6,401	6,829
Total number of loans	1,558	1,748
Number of agricultural loans	1,001	1,371
Value of total loans UGX	1,136,690,991	1,647,496,908
Value of agricultural loans UGX	718,429,837	1,370,543,406
Overall PAR more than 30 days	4.3%	6.2%
Agricultural loan PAR more than 30 days	N/A	5.1%

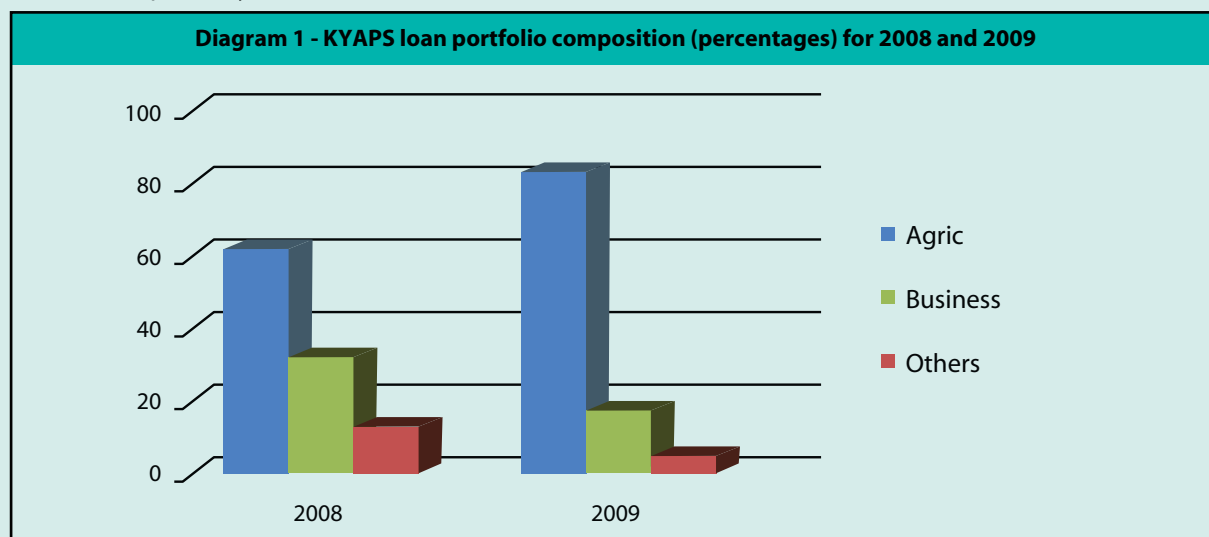
Source: KYAPS financial records and reports

² The interest rate on agricultural loans is on a reducing balance basis and translates into an effective annual interest rate of 15.6%. This is lower than the fixed rate of 2.5% per month for non-agricultural loans.

Performance and Impact

During 2009, significant growth in the number and value of agricultural loans, and also in the average loan size for agricultural borrowers was registered by the SACCO. Table 3 shows the comparative performances of the SACCO at the close of 2008 and 2009 respectively.

MSCL has also expressed interest to directly finance clients with agricultural loan requirements that exceed the current limit of KYAPS. This would be done in close collaboration with the SACCO, which will vet and recommend the clients and facilitate recovery of the loans at a commission. Once this



By portfolio composition, between 2008 and 2009, outstanding agricultural loans increased from 60% to 84% while business and other loans fell from 30% to 11% and from 10% to 5% respectively, as shown in the diagram above.

The other significant impacting trends realised by the SACCO in 2009 include:

- The doubling of the maximum amount for agricultural loans to UGX 30 million to cater for bigger requirements like trucks for tea transportation and larger groups;
- New policy that permits refinancing of agribusinesses, thus allowing agricultural borrowers to access top-up loans;
- Increase in the agricultural loans threshold to UGX 500,000 to optimise the SACCO's loan management costs;
- Expanded geographical outreach, to Ruhinda county;
- Lower interest for agricultural loans above UGX 20 million (at 2.33% per month);
- Continued diversification and deepening of agricultural value chains financed by the SACCO;
- Increased offsetting liabilities for agricultural loans, accessed from MSCL, from UGX 200M in 2008 to UGX 315M in 2009. This increase has been permitted by the SACCO's commitment to lend to agriculture, its competence as a lender and its excellent performance on repaying the loans accessed previously.

is realised KYAPS expects to reap additional loyalty from its membership and further deepen its growth potential.

At the borrower level, the more favourable borrowing conditions have enhanced the relationship between the SACCO and its members. The greater loyalty has paralleled improved livelihoods through increased household incomes and savings, more and better nutrition and enhanced access to household assets and equipment. All this has been facilitated by expanded investment in agricultural enterprises. This has been confirmed by a number of SACCO members during the collection of information for this article, who have been able to increase and diversify their agribusinesses from the repeat and continuously improved agricultural loans accessed from KYAPS. Indeed one client acknowledged that MSCL has identified him as one of the expected beneficiaries of its pilot direct lending for his integrated poultry, piggery and feeds production investment that requires financing in excess of what KYAPS can offer.

Further, the successful lending by KYAPS has directly impacted the competitive thinking by other financial institutions in the area. Many SACCOs in Bushenyi are emulating the efforts of KYAPS and are making concerted efforts to learn from the KYAPS agricultural lending initiative.

Portfolio at Risk (PAR)

Though the SACCO maintained a PAR (more than 30 days) for its overall loan portfolio and agricultural loan portfolio at less than 3.5% and 2.9% respectively during the first half of 2009, this trend changed during the second half of the year. By December 2009 the PAR for overall loan portfolio and for agricultural loan portfolio had increased to 6.2% and 5.1% respectively and thus exceeded the corresponding position at the end of 2008. For the agricultural loan portfolio, the increase in the PAR has been due mainly to the prolonged drought during the second half of 2009. This seriously affected the timing and volume of agricultural production, while the high portfolio growth overstretched the loan officers' case loads, and delays were experienced in receipt of transfers from tea factories and dairy processors for the loans with structured payments.

Although the SACCO is aware of the need to restructure the loans in arrears in order to maintain healthy delinquency, the clients have to be fully sensitised about this and also this has to be sanctioned by the board – a policy yet to be pursued. By the end of December 2009, there were promising signs of sufficient recovery in agricultural production and the SACCO is confident that it will reduce its PAR significantly during the first quarter of 2010. It also intends to continuously monitor its delinquency and take timely decisions that will permit it to keep the PAR down to a maximum of 3%, though this is still constrained by an inappropriate SACCO management information system that is not permitting the daily monitoring of the PAR. The lack of real-time networking between the SACCO branch and the headquarter operations is a further constraint to effective and efficient portfolio management.

Comments on issues raised on the 2008 article

As indicated in the Introduction above, two sceptical concerns were raised on the 2008 article regarding the agricultural lending efforts by KYAPS, specifically the sustainability prospects of the agricultural loan portfolio without the SACCO relying on external support and the impact of the perceived comparative advantage in lending for the tea value chain. KYAPS' reactions on these issues are summarised below.

KYAPS clearly acknowledges the catalytic impact of the complementary external support it received

during its concerted effort to engage in proper agricultural lending, and duly concedes that it could not have realised the current performance in agricultural lending without such support. However, the SACCO maintains that from the outset it clearly knew that this support was rather complementary to its own vision about financing agriculture and was not simply a subsidy. This is confirmed by the fact that though the technical assistance by Rural SPEED and MSCL, and the linkage support by Centenary Bank, terminated prior to the end of 2007, the SACCO's agricultural lending portfolio has continued to grow.

Further, external support was not exclusive to KYAPS but was also extended to other SACCOs in the region, whose level of engagement in agricultural lending is numerically lower than that of KYAPS. The SACCO, however, acknowledges that there are still gaps that it cannot successfully surmount by itself in the short run due to financial limitations and thus would still require more external support.

However, access to such support is not considered a *sine qua non* for continuous engagement by the SACCO in agricultural lending. Skills enhancement for the new loans officers and new board members, outreach capacity support, better MIS and, agricultural loan product review and refinement are relevant for further external complementary support to steer the agricultural lending by the SACCO to higher levels.

As to the perceived advantage harnessed from the tea activity, KYAPS contends that this is a competitive rather than comparative advantage. It has no irrevocable attachment to financing tea and thinks any other agricultural activity with equal risk and profit profile like tea can be equally successfully financed. The history of the tea activity in Kyamuhunga dates far beyond the SACCO's existence and its active engagement in agricultural lending, yet no other financial institution had previously focused on financing it to the comparable depth and complexity as has been done by KYAPS.

The SACCO has since 2005 innovated better approaches to financing the tea value chain at lower cost and risk and thus contends that it has developed a better niche that needs elevated attention compared to other risky agricultural value chains. Therefore, to KYAPS, financing the tea value chain is an example of the sort of lower risk and higher profit proposition that any rational financial institution must pursue for growth and portfolio sustainability.

More significant though is the fact that the majority of the SACCO membership is engaged in tea agribusinesses and therefore the SACCO would have no justification not to engage in financing the sector. Nonetheless the SACCO has continued to diversify the portfolio of its agricultural loans in order to broaden its outreach and also to hedge against the future eventuality of any down side on the tea portfolio.

New lessons learned by the SACCO in 2009

The new lessons learned in 2009 are summarised below.

- a) Gaining full understanding of the functioning of the value chain of the commodity considered for financing provides better mechanisms to successfully finance agriculture. These improved mechanisms are of course directed to continuous innovation to minimise lending costs and risks. For example, approximately 60% of KYAPS loans to tea and dairy value chains are recovered through structured payments by the commodity buyers.
- b) Agricultural production shocks are inevitable and thus need to be factored in the financing of agriculture through carefully thought-out mitigation measures. These remain an area awaiting KYAPS innovation. Also, despite the policy shift to permit larger agricultural loans, actual lending is still restricted by inadequate rural collateral. Mechanisms like agricultural loan guarantees and appropriate financing products like leases would further enhance confidence and comfort in agricultural lending.
- c) Building confidence and maintaining transparency is very important in leveraging loan funds. This has been the main tool for accessing relatively low cost offsetting liabilities, of successively increasing amounts, from MSCL. At no point has KYAPS ever lent funds accessed from MSCL for non-agricultural purposes.
- d) Technical assistance that is targeted as a catalytic activity rather than dependency support yields sustainable impact. The termination of technical assistance by previous KYAPS partners such as Rural SPEED and Centenary Bank has had no impact on the performance of the SACCO, as it clearly knew from the beginning that these were time and finance resource-bound interventions, and KYAPS had prepared for their termination.
- e) Full institutional commitment is a key to successful efforts in lending to agriculture. KYAPS agricultural lending has been fully embraced by the board, management and SACCO membership with resultant flexible and conducive policies, supportive physical resources and energised staff, all of which have played a complementary role in developing and maintaining the SACCO's successful agricultural portfolio.
- f) The external policy and regulatory environments need to be aligned to the realities of agricultural value chain financing. While KYAPS correctly considered agribusiness value chains in its full domain of agricultural finance, it has faced difficulties with the Uganda Revenue Authority, which largely considers most agribusinesses as non-agriculture, a case in point in this regard being the loans for livestock fattening that have been blatantly categorised as business loans and therefore have been excluded from the category of "profits - agriculture" allowed for deduction for taxation purposes.

5.2 The Experience of Rukooma SACCO in Lending to Agriculture ¹



Introduction to Rukooma SACCO

Rukooma Savings and Credit Co-operative Society stands out in the SACCO sector as one of the financial institutions that has made a success of lending for agricultural production investments.

Rukooma is owned by 3,942 members, with a total share capital contribution of UGX 231,512,950 at a nominal share value of UGX 20,000, as at 30th September 2009. The institution started its operations as a SACCO in 2000 and is located in Katerera trading centre on the Ishaka-Kasese road, Bushenyi district in South Western Uganda.

The SACCO targets its membership in three locations. Firstly, in Bunyaruguru County- Bushenyi district, secondly in Katungulu (around lakes Edward and George) in Kasese District and thirdly, in Kyendangala in Kamwenge district. The last-named area is served by a mobile branch that operates a minimum of twice a week.

In their Annual General Meeting the members elect, for a two-year term, a nine-member Executive Committee (Board) to oversee the affairs of the SACCO. Apart from the Board the SACCO has five Committees: Supervisory, Loans, Finance, Mobilization and Disciplinary. All these meet every quarter except for the Loans Committee that meets on a monthly basis.

The SACCO has thirteen members of staff composed of a manager at headquarters, two branch managers, three loans officers, three cashiers, one accountant and three office attendants.

With a membership made up largely of those who earn their main income from farming, and with a loan portfolio heavily weighted towards agricultural loans – which stand out as being the soundest loans in its asset portfolio, Rukooma has lessons for other SACCOs that are struggling with their farm-linked loan portfolios.

¹ Author: Prossy Tumushabe Bahigwa, Microfinance Support Centre Ltd. (MSC)

Behind the success of Rukooma - Outline

The most basic reason for the success of this SACCO as an agricultural lender is that its members enjoy access to profitable farm production possibilities, due to favourable natural conditions in the Bushenyi District, in South Western Uganda, happily coupled to a well-organized and ready market for the main commercial crop – cotton.

These factors, strictly outside of financial sector support, have been enhanced by a close relationship with the Microfinance Support Centre Ltd. (MSC). MSC has extended four major agricultural loans to the SACCO, together with providing training and advisory support over a number of years.

This article describes the approaches used by the SACCO in making agricultural loans, together with some detail of the support received, and the benefits associated with it, for the SACCO itself and for its farming members².

MSC support to Rukooma SACCO

The Microfinance Support Centre Limited (MSC) has over 60 percent of its portfolio in agriculture. MSC is a Government owned company, limited by guarantee, incorporated in 2001. It is the linchpin of Government of Uganda microcredit programs under the Rural Financial Services Strategy (RFS). MSC offers affordable credit through loan products that support agricultural production, value addition and marketing. It also offers business development services to its clients. In addition to commercial activities, the company also focuses on activities related to environmental protection and special interest groups like women, the youth and people living with disabilities.

Between 2002 and 2009 Rukooma borrowed four Agricultural loans and five Commercial loans from MSC, for a total value of UGX 651m. The four Agricultural loans accounted for 61 percent of this. The repayment of MSC loans has been fully in line with the repayment schedules, even though repayments of the Commercial loans disbursed by the SACCO to its members were below 100 percent.

Table 1: Distribution of loans between farm and off farm activities

No		As at Dec 2007	As at Dec 2008	As at Dec 2009
1	Clients borrowing for off-farm activities	2,571	3,074	3,074
2	Clients borrowing for farm activities	532	589	579

The SACCO's average loan size to its members is UGX 640,000, with an equal distribution between male and female clients. Off-farm activities account for the greater number of loans, but these are for smaller amounts, on average, than the agricultural advances. More information is given in Table 1 above.

Table 2 below sets out an aggregate summary of key financial data relating to services provided by the SACCO to its members. The growth over the period 2007-2009 is abundantly clear.

Table 2: Rukooma SACCO - Key financial data (UGX)

No	Portfolio Item	As at Dec 2007	As at Dec 2008	As at Dec 2009
1	Share capital	133,999,900	188,670,100	250,470,450
2	Deposit liabilities	191,062,934	303,318,540	252,360,568
3	Loan assets - total	403,220,485	550,824,550	646,210,889
4	Loan assets, non-farm	270,670,320	255,900,210	156,670,440
5	Loan assets, farming	132,550,165	294,924,340	489,540,449

² See also the section below, headed 'BEHIND THE SUCCESS OF RUKOOMA – DETAIL'

Product Range and Performance

The SACCO offers several loan products to its members. The products include Commercial, Agriculture, School Fees, Emergency and Motorcycle (Boda Boda) loans.

members and pays them through Rukooma SACCO. This mechanism enables the SACCO to achieve an impressive cotton loan recovery performance.

By contrast, PAR for non-agricultural loans in 2009 was 17%, 2% and 1% for over 30, 60 and 90 days respectively.

Table 3: Features of different loan products offered by the SACCO				
Items	Commercial loan	Agricultural loan	School fees	Motor cycle
Nominal interest rate per month on declining balance method	3%	2.5%	2%	3%
Insurance of loan amount	1%	1%		
Commission (of loan amount)	2%	2%	2%	2%
Loan application fees [UGX]	2,000	2,000	2,000	2,000
Minimum loan [UGX]	50,000	50,000	Depends on fees bill	500,000
Maximum loan [UGX]	4,000,000	3,000,000	2,000,000	1,500,000
Loan period (months)	3 – 10	4-8	5	Up to 10
Grace period	None	4-8 months	None	None
Repayment frequency	Monthly	See footnote ³	Monthly	Monthly
Repayment rate	80	100	87	71

These products have varying features: loan period, interest rate charged, grace period, repayment schedule, minimum and maximum loan amounts, amount of fees charged. Details are presented in Table 3 above.

The Effective Repayment Rate (ERR) has increased over time due to revised loan product terms and recovery strategies. The flexible terms of the Agricultural loan (grace period and payment after harvest) have improved the loan portfolio quality.

Portfolio at risk (PAR)

The PAR of the Agricultural loans disbursed in 2009 was at the exceptional figure of zero percent. The explanation for this is that these loans have been closely tailored to the expected cash flows from agricultural activities, plus the SACCO has been careful to lend only to those members who are known to have other income that could be used to meet loan amortization responsibilities if farming returns should fail to materialize.

Again, some 80 percent of agricultural loan borrowers are cotton growers. As already noted, there is a ready market for cotton. This is reinforced by the fact that all farmers who borrowed for cotton growing are members of a farmers' co-operative society that sells all the cotton on behalf of its

Challenges faced by Rukooma SACCO in Agricultural Lending

The SACCO has the biggest share of its portfolio involved in investments related to agriculture. They include: growing of crops (cotton, maize, water melon, rice and ground nuts), raising livestock and poultry, with over 80 percent of members involved in growing cotton. Although the SACCO has been successful in its lending to agriculture, it has faced a number of challenges.

- **Lack of adequate market for crops other than cotton**

Although cotton has a ready market, not all farmers are involved in growing this crop. Indeed, the markets for other crops, such as maize, water melon, rice and groundnuts, as well as for livestock and poultry products, are poorly structured. The scattered location of farmers makes marketing of their produce very difficult, due to the challenges of cost and distance in assembling product for sale.

- **Expensive agricultural farm inputs**

Farmers find it expensive to purchase these inputs and tend to avoid buying and using them. As a result they end up achieving very poor yields. Those who do use improved inputs

³ Clients pay interest from disbursement, but grace period for principal repayment applies until after harvest.

reportedly complain that the high cost implies an unacceptable increase in their costs of production.

- **Poor road network**

The roads leading to the main road from the farmers' holdings are in a very poor state. This means that when farmers harvest they often have to wait for drier weather before selling their produce. This leads to losses for perishable produce like water melon etc. This affects the cash flow of individual households, which eventually affects loan repayment schedules of farmer clients of the SACCO.

- **Climate change**

Prolonged drought or excessive rain affects agricultural production cycles. Post harvest handling is difficult when storage facilities are poor, especially when the rainy season is prolonged. This can lead to heavy losses.

- **Costs of operating distant and mobile branches**

The major challenge is the distance involved in appraising and constantly monitoring the agricultural loans in the districts of Kamwenge and Kasese. These are over 150 km away from the SACCO headquarters.

Behind the success of Rukooma - Detail

The SACCO has had several factors that have enabled it to successfully lend to agriculture, despite the challenges mentioned above. These include:

- a) **Subsidized credit from MSC with favorable features for lending to agriculture.**

The SACCO has accessed four loans worth Uganda UGX 470m which is over 60 percent of its total loan portfolio. These loans have favorable terms for lending to agriculture, i.e.:

- *Grace period of 6 - 12 months.* This is specifically designed to enable the SACCO to allow farmers to harvest and begin selling their produce before paying back to the SACCO. Indeed, the SACCO passes on this benefit from MSC by offering borrowers of agricultural loans a grace period of between four and eight months.
- *Interest loan charged.* MSC charges borrowing SACCOs nine percent per annum on agricultural loans, calculated on the declining balance. This leaves the SACCO with enough margin to meet its

operational costs, especially the regular monitoring of the agricultural loans, and also allows it to lend at affordable rates to its members.

- *Loan sizes and repayment frequencies.* One of the major challenges of lending to agriculture is underfunding of agricultural activities, as this can so easily lead to failure of the enterprise in which the investment is being made. MSC has always advanced adequate loan sizes to the SACCO. As a result Rukooma has been able to meet the effective loan demand of its members. Regarding the repayment frequency, the SACCO is given the liberty to negotiate the repayment frequency. This allows the SACCO to design loan periods and repayment frequencies depending on the nature of members' enterprises. This minimizes on the default rate.

- *Specialized training and technical assistance offered by the Microfinance Support Centre (MSC) Limited.* The company organizes training in agricultural and rural lending. This training is supplemented by the technical back stopping that is offered by MSC on a quarterly basis.

- *Exposure visits.* The Board, Management and Loan Officers of the SACCO are exposed to operations of other institutions that have been successful in lending to agriculture. The SACCO carries out these visits once every year and this has exposed them to good practices.

- b) **Careful loan appraisal**

As noted above, the SACCO is careful to select borrowers who have off-farm income that could be tapped in case of a failure of farming ventures.

- c) **Ready market for one of the products (cotton) of the SACCO members**

The Nyakatonzi Growers' Cooperative Union is an important factor in the successful marketing of cotton in the Rukooma catchment area. However, this buyer is not alone. The Bushenyi Cotton Ginnery and other individual buyers constitute a competitive market for SACCO members' produce. This gives farmers an opportunity to make a choice and negotiate with potential buyers, resulting in a better price than would otherwise be received.

d) The SACCO is a preferred lender to agriculture in the area, despite the presence of other institutions that are offering financial services.

The SACCO is not in a monopoly situation in offering financial services in the area. There are other players in the area that have opened up both physical and mobile branches. They include: Uganda Action for Development (UGAFODE), Centenary Bank, Kyambura SACCO, Katerera SACCO, Feed the Children and Bunyaruguru SACCO. However, these named institutions are not known to be offering agricultural loans to any significant extent. Therefore little real competition is being faced by Rukooma SACCO, in its area of operation.

e) Presence of Katerera Area Cooperative Society (ACE)

The ACE has taken on the responsibility of mobilizing members to join the SACCO, and to collectively market their produce. This marketing mechanism creates favourable conditions for the sale of farmers' produce as it attracts bigger buyers that offer better prices. Thus ACE has done a great job in seeking and identifying better markets for farmers that are not engaged in cotton growing.

f) Rukooma Farmers' Co-operative Society has enabled the SACCO to achieve very high recovery of its loans lent to farmers who are growing cotton.

All members of this farmers' cooperative society are members of the SACCO. The Society operates an account with Rukooma SACCO. This is used to credit farmer members' accounts in the SACCO, after selling the produce. This both minimizes default and lessens the cost of recovering loans made by the SACCO.

g) Facilitating the opening up of agricultural input shops in its branches

The SACCO has facilitated the opening of farm input shops in areas where it has its branches. This has brought services nearer to the farmers. In turn this has enabled them to have easy access to the improved seeds, chemicals for weeds and pesticides that can improve their levels of production and productivity.

h) The SACCO is affiliated to Uganda Co-operative Alliance (UCA)

UCA offers technical assistance in the general operations like generating reports, keeping records, mobilizing members to grow their share capital and product designing. This helps the SACCO to improve its efficiency.

i) Qualified and experienced staff in the core business of the SACCO

The presence of qualified staff makes it possible to benefit from the training events, from the technical assistance from MSC and UCA, and from the exposure visits in which the SACCO is involved every year.

Finally...

Rukooma's success bolsters the modern view of successful agricultural investment being dependent on support for the entire value chain (production, value addition and marketing). More than this, Rukooma shows how it is done, through forging ongoing collaborative mechanisms with sister institutions, such as cooperative societies and firms that provide services of input supply and crop marketing.

Despite the successes outlined above it is recognized that better advisory services to farmers are needed, so as to improve the management of soil fertility, application of appropriate technology, disease control, post harvest handling, value addition and storage. Reliable advice on these technical fields is still in short supply, despite the existence of the National Agriculture Advisory Services (NAADS) programme in the area where the SACCO operates.

Marketing too needs to be given special attention in agricultural lending, especially for crops other than cotton, in the Rukooma catchment area. This involves working with local government (district leadership and local councils) to attend to physical infrastructure needs like transport, energy, water and storage facilities.

5.3 Agarú SACCO: A Beacon for Tier 4 Institutions¹



Editors' Note: *The Agarú story is presented in the Yearbook for three important reasons. Firstly, it describes how a SACCO, founded at a difficult period of history in the North, uses excellent standards of governance and management in order to serve its members effectively. Secondly, with the coming of peace in the countryside, it is now promoting and facilitating investment in the agricultural sector through careful adherence to good banking practices coupled with the organization of technical assistance for its borrowing farmers. Thirdly, it provides an interesting example of how one large SACCO can effectively economize on scarce governance and managerial talent by spreading over a number of sub-counties, through branches, rather than adhering to the policy of one SACCO per sub-county.*

Section 1: Agarú SACCO's Background

Agarú Cooperative Savings and Credit Society Limited (Agarú SACCO Ltd) is owned, used and controlled by its members. The SACCO was established in October 2001 under the Cooperative Statute 1991 and commenced operations in March 2002. The liability of a member is limited to three times the amount of shares held by the member. The registered area of operations was to cover Northern Uganda including Masindi District with a number of branch networks, ultimately 25 kilometers apart.

The coverage plan was however frustrated by the 22 years of insurgency in Northern Uganda that disrupted the economic activities, destroyed infrastructures, and weakened the coping mechanisms of the communities in the region. Hence Agarú SACCO Ltd (The SACCO) has so far opened up only two branches at Kalongo and Pader Town Councils, but it is scheduled to open one more branch in Lacekocot, and two Agencies in Patongo and Nam-Okora in 2010.

The SACCO was formed with the overall objective to provide sustainable rural financial services to its members, who are mostly engaged in agricultural activities. Therefore, right from the very beginning, the SACCO identified the target membership as the rural agriculture communities that would provide the niche market for the SACCO's rural financial services.

The Annual General meeting of the members elect the Board of Directors and the Supervisory Committee members for two year terms, renewable once. The unwritten practice is that members who are active in politics are not elected on Board/Committees of the SACCO. The Credit and Human resources committees of the Board are functional. Agarú SACCO Ltd is guided by its Vision and Mission statements which were translated into the current Strategic Plan 2008-2012.

¹ **Author:** Moses Opio Ogal, Founding Board Member of Agarú SACCO, and currently CEO (Atg) and a Board Member

Agaru SACCO's success story lies in the abilities of management and Board to cope with very difficult situations in the war-affected area. The Board composition includes seasoned bankers, a lawyer, administrators, doctors, a teacher, farmers, a businessman and a priest. The Board therefore understands local needs, and is trusted by the communities. The minimum qualification of all operational staff is a diploma in a relevant subject e.g. Accounts, Agriculture, Computer Science, Banking, Microfinance. On top of this, staff continue to undergo skills-based courses, at least twice a year.

The SACCO started with nine committed Board members and four employees, all of whom have roots in the Acholi sub-region. The founding Board's main aim was to voluntarily give back to the community traumatized by the insurgency, through the provision of access to financial services and thus empower them to become economically active. During the first three months of operations, and with memories of the collapsed Uganda Cooperative Bank, the members were cautious about the safety of their money with cooperatives.

Given the then insecurity in the area, members would, in the evening, deposit their money in the SACCO for fear that they could be robbed at night (transfer of risks) and in the morning withdraw and keep the monies themselves. Initially Agaru had to keep almost 100 percent of savings deposits in liquid cash. However, members soon got tired and gained confidence when they tested and confirmed that they could access their money whenever they needed it. Now some members only check their accounts for dividends and savings interest updates.

Most of the Board members and staff went beyond their call of duty, at times even risking their lives to ensure the safety of deposits and the availability of liquidity for their members at all times. The Board members had their own sources of income and did not initially borrow from the SACCO, nor did they regard the SACCO as their source of living. Because the SACCO was with them even during the insurgency while some institutions closed their offices, the communities view the SACCO as one of their own. This reinforced the loyalty, ownership and confidence of the members that Agaru SACCO is a safe, sound, reliable and convenient financial institution. Even now, most members who received their salaries through the two bank branches in the District prefer to withdraw all the salaries received and deposit with the SACCO instead.

The Board instituted a succession plan for the management and itself. Out of the original founding Board members, only three out of the nine are still on the current Board and by next election, they will exit. But to retain the institution's memory and values, at least one member of the founding Board is elected on the Supervisory Committee every two years and possibly another one on the Board. The staff number has now expanded to 31 including six agriculture project staff. Five more are to be recruited in 2010.

The SACCO has as at 31st December 2009 surpassed all its targets set in the Strategic Plan, and now that there is relative peace, there are increased business opportunities and the Strategic Plan is to be reviewed for the periods 2011 and 2012 in order to set realistic targets. The AGM resolved that all borrowers must hold at least two shares as a strategy to increase Institutional Capital.

Table 1: Time series Performance of Agaru SACCO Ltd (UGX)

Product/Period	Audited			Unaudited
	2006	2007	2008	2009
Savings	1,575,855,000	2,088,959,000	2,344,095,000	2,510,286,331*
Share Capital	33,760,000	49,060,000	64,373,000	93,368,000*
Loans Outstanding	100,650,000	276,530,000	887,850,592	1,699,055,844*
Agricultural	-	20,700,000	271,569,544	861,901,459*
Commercial	-	9,800,000	375,344,163	471,347,458
Others	100,650,000	246,030,000	240,936,885	365,806,927
Profit & Loss	30,390,000	(35,430,000)	50,856,000	161,344,000
No. Members	1945	2,811	3,583	13,438*
No. Borrowers	43	341	818	2,698*

* The data capture individual members in the groups as per PMT standard definition. In 2006 to 2008 a group is counted as just one member.

Three main factors caused the drop in total savings deposits growth rate in 2009. Firstly, there was increased competition for the members' deposits by the two bank branches opened in our area of operation, given that SACCOs are not permitted to clear cheques. Secondly, the prices of crops at harvest time have been low and our Agriculture Loan borrowers prudently stored their produce, waiting for the prices to rise during the second quarter. Thirdly, there was delayed payment to members for contract work performed for the District and for donors. This locked up savings away from agricultural investment, as the money was needed for living expenses. Agarú SACCO will open three additional units in rural areas and seek clearing linkages with a commercial bank to address this decline in deposits growth rate.

Post Bank has now confirmed that the planned linkage banking with the SACCO will be implemented during the year 2010. This, plus a mobile money transfer product that is to start with two telephone service providers, Zain and MTN in March 2010, will improve our competitive advantage in the District.

Due to the then prevailing insurgency in the sub-region, the SACCO prudently slowed the expansion of its loans products, especially to the Agriculture Sector over the years, 2002 to 2007. Most of the excess liquidity derived from members' savings, for safety reasons, was invested in Treasury Bills.

Section 2: Agarú and Agriculture in Pader District

Pader District is an area suitable for both crop and animal husbandry. The District is bisected by several rivers and streams which empty into River Aswa that then flows into River Nile. There are also adequate underground sources of water for irrigation programs. Pulses, cereals, cotton, aquaculture thrive well in the District. Bee honey, improved by nectar from the Shea nut tree, is one of the best quality honeys in the world. Three ranches, Aswa, Agago and Acholi, are evidence of good pasture land for animal husbandry. With the current restocking programs by donors, Government and private individuals, we expect the District to gain its past glory, when cattle from the District were the first choice for butchers in Kampala City, ahead of cattle from other parts of the country.

The typical household in Pader District has access to a minimum of five acres of land under the customary

clan land ownership practice. The demand for Agriculture loans per household in the District is on average UGX 1,500,000 for a set of animal traction stock and equipment plus inputs for cropping e.g. labour and seeds. There are also requests for tractors, implements and for the procurement of heifers for milk. But all these demands are at present distorted by grants and various kinds of support to the returnees, i.e. Internally Displaced Persons (IDPs). It is therefore difficult to distinguish between effective demand and wish lists during this transition period from the IDP camps.

Effect of the Insurgency: Pader District is one of the districts worst hit by insecurity, a situation that lasted for more than two decades, arising from the Lord's Resistance Army (LRA) rebels and raids by the neighboring pastoralists tribe – the Karimojong cattle raiders. The combination of these left the population traumatized, in absolute poverty, fear, and dependent on relief support from donors. There was a complete breakdown of infrastructure, institutions, establishments and the traditional coping mechanisms of the community. In 2009, there were only three Agriculture Officers, including the Head of Department, in the whole District, to serve 24 Sub-Counties, three Town Councils and 78,000 households of approximately 400,000 people. The Cooperatives, which were the main vehicles for organized production and marketing of farmers' produce, likewise became defunct.

As a result, agribusiness collapsed and although it is sluggishly picking up, there are still glaring gaps in the production process for both food security and income generation, despite the huge potential for commercialization of agriculture in the area. Even the modest production realized is being bought cheaply at the farm gate, with huge profit margins that are reaped by the middlemen / produce buyers rather than by the farmers.

Before the onset of the insurgency, there was clear categorization between food and cash crops. In Northern Uganda, especially at the subsistence level, the traditional food crops were millet, sorghum, sesame, peas, groundnuts, sweet potatoes and to a very small extent maize. Cotton was the major cash crop marketed by the Cooperative Movement, in contrast to other parts of the country like West Nile (tobacco) and Central Region (coffee and tea).

With the increasing population, climate change, feeding culture changes, and the cash economy experienced in the IDPs camp, there is now no marked demarcation between "food and cash" crops.

Any crop now has market value and it is the family to decide which crop is sold to meet their financial needs, depending on the market forces. The traditional food crops, now more marketable, are increasingly being grown. They never go to waste, since they can still be eaten if they are not sold.

Agaru SACCO encourages its members to selectively grow high value crops such as: maize, sunflower, beans, rice, groundnuts, cassava, sesame and soya beans, with increased crop acreages planted for sale. These crops can be sold as they are, or processed to add value and marketed locally, regionally and internationally. Soya beans, maize and sunflower cake are ingredients for poultry and fish meals. Crop varieties from improved seeds also adapt very well to unreliable rainfall and short seasons.

Southern Sudan, the neighbouring District of Lira, Karamoja sub region, schools, other Government Institutions and the World Food Program so far provide ready markets for the farm production. But as competition emerges in the market, bulking, quality, value addition and access to regional and international markets will become increasingly important for the sustainability of agribusiness and therefore the mutual benefit of financial services of Agaru to its membership. The warehouse receipt system being piloted by Agaru SACCO is an alternative solution to this challenge. Several donors and produce buyers have set up small stores all over the District, but their uneconomic sizes and multiple objectives limit their sustainability to the projects' lifespans and budgets.

Section 3: Agaru and Agriculture as a business

Agricultural lending is very risky because of the many natural factors like pests and weather. Agaru equally faces this very big challenge. The year 2009 was characterized by severe drought which affected most members and impacted negatively on the PAR of the SACCO to a high 48 percent as at December 2009. To reduce the PAR, the SACCO has recruited more Loans Officers, rescheduled the agriculture loans affected by droughts, embarked on serious recovery efforts. Each staff and Board member is assigned bad loans to recover, lists of defaulters have been posted on notice boards for the purpose of peer pressure, and loans already provided for since inception will now be written off in the 2009 accounts. The recovery efforts are beginning to pay off and 11 percent of the loans in default have been recovered within one month.

Agaru SACCO is aware that its core business is the provision of financial services, but is cognizant that without addressing the needs for improved and increased food production, poverty reduction and commercialization of agriculture, financial intermediation or access to financial services would remain a dream in the predominantly rural agriculture community served by the SACCO.

The SACCO, in an attempt to provide solutions to this situation, introduced:

1. New agricultural loan products such as:

- Animal traction loans
- Poultry production loans
- Tractor loans
- Piggery loans
- Aquaculture loans
- Apiary loans
- Crop production loans.
- Agro processing mill loans.
- Produce marketing loans

2. Employment of Agriculture Extension

Workers (AEWs) to give agricultural training to the members. The Italian Cooperation supported their salaries and administration expenses for one year. The AEWs trained the membership on food security issues, improved methods of farming using the recommended agronomic principles, modern tools, improved seeds and marketing.

3. Trainings on group dynamics.

4. Sensitizing members through radio talk shows about the benefits of the warehouse receipts system so that they do not sell primary products at the time of harvest but rather store them and also add value to the products before sale.

5. Provision of quality and improved seeds to our members in collaboration with the Italian Cooperation.

6. Participation in agricultural shows, radio talk shows, seed fairs and farmer field school tours. This has enabled our members to appreciate new ideas as well as share experiences with others.

7. In order to improve the members' living conditions, the SACCO also introduced demand driven financial services that the rural agriculture communities desire, namely solar energy loan products, low cost

Table 2: Loan products offered by Agarú SACCO Limited

Loan Products (Interest calculated on declining balance method)	Maximum loan period (months)	Annual Int. Rate (%)
Agricultural loan	18	18
Commercial loan	12	36
Salary loan	18	30
Animal traction loan	24	18
Tractor loan	36	18
School fees loan	6	30
Staff development loan	12	Treasury Bill rates
Emergency loan	3	30
Housing loan	12	24
Motorcycle loan	24	30
Personal loan	12	30
Domestic loan	12	30

In the pipeline, the following products are under pilot testing	Maximum loan period (months)	Annual Int. Rate (%)
Warehouse receipt financing system	6	24
Low cost housing loan	36	24
Electricity house wiring loan	12	24
Mege (Women) in Business loan	12	30
Solar power loan.	24	30

housing loans, electricity house wiring loans, Mege (Women) in Business loans, education loans and motorcycle loans. The common factor with all these products is that the borrower should be engaged in agricultural activities. Moreover, the main source of repayment is to come from the sale of agricultural products.

Agarú's Agricultural Loan Portfolio

The IDP camps are being dismantled and the people are returning to their farm lands. Agarú's main focus is to support the returnees, who are mainly peasant farmers, by providing financial and agronomy training before disbursing agricultural loans to them. As a result, the SACCO's Agricultural loan portfolio increased tremendously in 2009 by over 60 percent. The Italian Cooperation provided emergency support funding for one year (2009).

Section 4: Challenges of lending to the Agriculture Sector - Suggested ways forward

- **Lack of adequate numbers of Agriculture Extension Workers:** It is a challenge to pass on sound agronomic practices, introduce new seed varieties and thus modernize and increase yields from agriculture activities. Pader District had only two Agriculture Workers in addition to the District Agriculture Officer. The SACCO through financial support from Italian Cooperation recruited 10 Agriculture Extension Workers, one for each sub-County, for a period of one year (2009).

Table 3: Agriculture Loans Portfolio

Loan Product	2008		2009	
	Loans a/c Numbers	Amount Granted (Ugx.)	Loans a/c Numbers	Amount Granted (Ugx.)
Production	13	14,450,000	57	285,434,218
Processing	04	4,650,000	53	149,902,177
Marketing	57	264,174,130	47	194,513,535
Animal Traction	-	-	86	103,155,964
Tractor loan	-	-	02	120,892,572
Totals	74	283,274,130	245	853,898,466

- **Financial Education:** Especially among the rural community, savings and borrowing cultures were informal and based on traditional systems of social norms. There is hardly any basic book keeping or farm records kept. Loan appraisal and evaluation of enterprises for profitability and sustainability is costly and time consuming. Some of our members, due to inadequate training, believed that they were receiving donations instead of loans.
- **Storage and Commercialization of crops/yields:** Quality and bulking of yields is a prerequisite to achieving improved income from agricultural enterprises. Our members experienced post harvest losses as a result of poor storage facilities at their abodes, caused by pests, exposure to weather vagaries, fires and theft. Farmers are forced to sell off their crops at the time of harvests when supply is high and the prices are low. Value chain additions and warehouse receipt systems are the way forward.
- **Unreliable rainfall and unpredictable weather changes:** In 2009, crops loss due to drought was about 30 to 40 percent for most crops, but ranged up to 70 percent for groundnuts. The farmers are finding it extremely difficult to adjust or plan for the next farming activities since they totally rely on rainfall. Group farming for say 20 households for 100 acres and the provision of shared irrigation systems could mitigate this risk.
- **Lack of improved and quality seeds:** Most of our farmers still depend on the traditional crop types since they keep their own seeds. These local crop varieties are very susceptible to drought, pests and diseases, and have very low yield, with mixed quality. Even when seeds were procured from licensed seeds vendors, the germination percentages were sometimes unsatisfactory.
- **Inadequate capital:** With people living in IDP camps, most of the farmland became overgrown with bushes and the most commonly used farm tools now are hand hoes, pangas, axes and sickles. The subsistence farmers can as of now open only a few acres of land for food security with nothing to spare for income generation. Even those who would wish to open commercial farms lack the initial capital to purchase the expensive farm equipment. Thus the vicious circle is perpetuated - very little output and poor quality, little savings, no investment and continuous subsistence production.
- **Commercial banks** do not lend to the microcredit agriculture sector due to the risks involved. Guarantee funds for agricultural loans to commercial farmers should not be limited to benefit commercial banks only, but also extend to microcredit institutions like Agarú SACCO.
- **Price factors:** The prices of agricultural produce are never stable, being very low at harvest period and very high during scarcity. Price fluctuations are accentuated by poor post-harvest handling, lack of proper storage facilities and the festive seasons when people prefer celebrations and conspicuous consumption. The Warehousing Receipt system and loan products could even out the farmers' cash flows and hence help stabilize the prices of the commodities.
- **Zoning of crops:** This is a good initiative from Government, but if not well explained, it could be misconstrued as favoring other regions to grow high value crops.

- **Conservatism:** The traditional beliefs in the separation of food and cash crops, fixed cultivation periods and farming patterns, are very hard to change. People are reluctant to adopt new methods of farming, new crop varieties and planting seasons and adjust to the weather changes. This means production and quality control is very low. Agriculture Extension Workers need to be recruited, at least one per Sub-County to train and sensitize Communities.
- **Poor transport network** to link farmers to the market.
- **Dispersion:** Tracking the individual borrowers is difficult since they are scattered all over the district and beyond, as the IDP camps are emptied.
- **Skills shortage in agricultural loan product development:** Lack of experienced personnel in agriculture loan products design, development and pilot testing.
- The **dependency syndrome** of the community (returnee IDPs) who still expect handouts and grants instead of microcredit.

Efforts to meet effective loan demand

As the IDPs from whom we draw most of Agarú membership return to their homes, they face many cash needs for which they look to Agarú SACCO for microcredit. Agarú cannot meet all their needs. In addition to members' savings, the SACCO identified various approaches to meet the effective loan demands.

Agarú strategies for agricultural investment promotion:

1. Triage: The population was divided into the economically active poor and the vulnerable groups. The economically active poor became the target for microcredit loans. Funds (UGX 500m) borrowed by Agarú from MSCL were lent to this category for various agricultural activities, e.g. to purchase tractors, bulls, ox ploughs and for some cash expenses such as labour. These loans were lent to members at a fair interest rate of 18 percent per annum. The AGM resolved that 5 percent out of the 18 percent should go directly to inner reserves to build institutional capital and a risk fund to help mitigate risks that may arise from agriculture loan

products. By contrast Agarú believes that the second category, the vulnerable, should be supported by Government and donors.

2. Emergency Agriculture Project: The SACCO collaborated with the District of Pader and with Italian Cooperation under a pilot project in Agago County of Pader District. The four objectives of the project were to:

- Enhance agricultural production through the introduction of animal traction and the provision of quality seeds,
- Build the capacity of Agarú and membership by supporting the salaries of AEWs, hiring consultants to support capacity building of AEWs, Agarú staff and training of memberships in animal traction and agronomy best practices,
- Develop St. Bhakita farm to act as a demonstration farm and the farm for multiplication of quality seeds,
- Promote commercialization of agriculture by setting up a sunflower oil mill and a warehousing receipt system. (The objectives were implemented except for the warehouse receipt system which is partly achieved and is being pilot tested.)

3. Savings culture rather than credit is emphasized to every member at all occasions. In 2009, the SACCO resolved to implement (effective in the year 2010) interest calculation using the declining balance method. Furthermore, in order to encourage timely repayments as per loan repayment schedules, Agarú SACCO offers a rebate of 10% on loan interest received to any member who makes all loan repayments as scheduled in the loan agreement.

4. Mercycorps, an NGO, collaborated with Agarú to pay returnee IDPs **cash for work** to build community access roads using local labour and hand tools. The community members became members of Agarú and can now access rural financial services.

By the end of the year 2009, the SACCO's loan portfolio was standing at about UGX 1.7 billion and nearly 40 percent of that went to finance agricultural activities.

For now, we are proud to say we have satisfactorily met the effective loan demand of our members.

Technical and Financial Support Extended to Agarú

Agarú SACCO Ltd has received some technical and financial support from various development partners as below, and we wish to take this opportunity to deeply thank all the donors who stood by us in two decades of insurgency, especially during the last eight years of our existence. Among others, the following have been very supportive:

1. GTZ/FSD supported and funded the computerization of two branches of the SACCO, and the review of the Accounting Manual. GTZ/FSD also supported one key IT specialist from the SACCO to undergo specialized training in Thailand. We are now able to develop and maintain several demand-driven loan products, a very difficult feat under manual operations. We are also more transparent and accountable to stakeholders; internal controls have improved and informed managerial decisions can now be made from available reports.

2. In 2009, Micro Finance Support Centre Limited (MSCL) extended a credit facility to Agarú and facilitated training courses for staff of Agarú.

3. The SACCO, in collaboration with Pader District Government and Italian Cooperation, entered into a Memorandum of Understanding to support 2,000 economically active poor farmers for one year. Under the Agriculture Project, while Agarú provided UGX 500m for microcredit and was responsible for the implementation and commercialization of the agriculture component of the project, the Italian Cooperation provided funding for training, purchase of animal traction units for the vulnerable, funds for rehabilitation of the warehouse and purchase of two lorries for marketing. The AEWs trained not only the target project beneficiaries but the general farmer community in the County. The project is ongoing, but the financial support will end in March 2010.

4. World Council of Credit Unions under the WOCCU SACCONet project in 2002 supported the SACCO to kickstart operations and provided training, logistics, and technical support, as well as the initial manuals.

5. SUFFICE/EU/GoU project in 2005 supported the SACCO with two motorcycles, one money safe and funded the training needs for that year.

6. AMFIU, UCSCU and UCA are affiliates which over the years collaborated with Agarú in various activities like training, study tours and voluntary supervision activities. We have received some collaboration, though limited so far, from the Rural Financial Services Programme of MoFPED.

Section 5: Conclusion

The Agarú story demonstrates that when governance and management are of sufficient calibre, the SACCO structure provides a suitable vehicle for the delivery of financial services to the agricultural sector.

Again, Agarú has found that along with adherence to sound banking practices, attention to technical support for the economic activities of the bulk of its membership – who are farmers – has paid off very well indeed.

Finally, the Agarú example shows how a single, strong SACCO, with branches, can effectively make use of scarce governance and management talent, and the equally scarce financial resources, to hire competent management and staff. This is in sharp contrast to current Government policy which is to encourage the establishment of several small SACCOs at sub-County level, rather than one strong SACCO per District with branches in sub-Counties.



Chapter Six

Innovations

6.1 Developments in WFP's Purchase for Progress (P4P) Programme ¹



Introduction

Inadequate access to agricultural markets by smallholder farmers has been recognized as one of the major reasons for the persistence of household poverty in the rural areas of Uganda (PMA, 2000 and NDP, 2009).

In the Uganda Participatory Poverty Assessment Project (UPPAP), lack of access to agricultural markets was the highest ranked factor (by 63 percent of the rural sites) as the cause of rural poverty (UPPAP, 1999). Indeed, building stronger markets may be the key lifeline out of poverty for many poor farmers in developing countries. Many donors and development partners including the UN agencies have recognized this fact and have initiated various projects and programmes aimed at increasing market access by smallholder farmers.

Of the various initiatives, the UN World Food Programme's Purchase for Progress (P4P) is perhaps one of the most innovative to-date. P4P is a five year, 21 country initiative aiming to address the two principal constraints facing smallholder farmers, namely poor market infrastructure and inadequate productivity. The initiative aims to increase the participation of the WFP in commodity markets.

Table 1, shows the purchasing performance of the P4P against the targets set for the first year of implementation. The table shows six commodities; although maize meal and fish (dry, salted, smoked) are also mentioned they have no set purchase targets.

¹ **Authors:** Dr. Bernard Bashaasha (Makerere University) and Elvis Odeke (World Food Programme)

Table 1: Purchase for Progress (P4P) Food Purchase Performance against Year 1 (2009) targets by commodity

Commodity	Year 1 Target (MT)	Year 1 Actual Purchase (MT)	Performance (% of target)
Maize grain	8,914	6,838	76.7
Pulses	857	531	62.0
Sorghum	1,029	0	0
Millet	240	0	0
Cassava chips (dry)	857	0	0
Sesame (simsim)	103	0	0
Total	12,000	7,369	61.4

Source: WFP Purchase for Progress Implementation Plan, March 2009 and P4P Progress reports, WFP, Kampala

As noted in Table 1, the overall performance on local commodity procurement was over 60 percent which is impressive given that the year 2009 was characterized by drought in many parts of the country, leading to poor harvests. This might also explain why commodity purchase in 2009 concentrated on traditional WFP commodities of maize and pulses. Diversification of the commodity basket was not achieved, with no purchases of sorghum, millet, cassava and sesame during the reporting year.

The P4P initiative also entails a number of activities that are at different stages of implementation; progress to date is described below.

Strengthening Agricultural Marketing Institutions

This activity entails construction of market access roads; construction of market collection centres equipped with cleaning, drying and bagging equipment; increasing access to market information; training farmers and medium scale traders in improved post-harvest handling, storage practices and marketing; providing “appropriate technology” farming equipment and inputs; and development of effective and sustainable agro-input stockist systems. More detail on each of these follows:

Construction of Market Access Roads

During 2009, market access roads were identified and mapped out in the Teso, Acholi and Karamoja sub regions. In Kotido district, the program funded the opening of a 47 km market access road. The program has drawn plans to construct or rehabilitate over 700 km of road through cash and vouchers for work initiatives or through private

sector construction companies, using labour-based approaches. The modalities are being formulated and details will be clear by mid 2010.

Construction of Market Collection Points/Centres equipped with cleaning, drying and bagging equipment

Initial work in this area has concentrated on working with stakeholders to identify and map out appropriate market collection points, giving due consideration to productivity, geographical distribution and appropriate forms of intervention. Hence nine areas have been identified for the establishment of market collection points.

In some cases, WFP will construct market collection points (e.g. the case of Kapchorwa) and in others, WFP will work with the private warehouse owners to have them licensed to operate the warehouse receipt system. In such cases (working with the private sector) WFP will contribute towards the renovation of such facilities as an incentive for the private owners to operate the Warehouse Receipt System (WRS).

The expansion and strengthening of the WRS has been earmarked as a major component of WFP Uganda's P4P initiative. The expansion of the WRS, since it involves upgrading warehouses, will enable small holder farmers, as well as medium to small scale traders, to have access to cleaning, drying, bagging, grading and storage facilities, resulting in increased quality of products. The facilitation of borrowing on the security of WRS contracts should also improve farmers' incomes. Current plans are for WFP to support the establishment of nine warehouses / market collection points ranging from 1,000 to 6,000 MT, in 2010 alone.

The establishment of these warehouses will take one or more of the following forms:

- a. Construction of new warehouses in areas that lack existing storage facilities and yet have surplus production, as is the case with Kapchorwa,
- b. Long-term leasing or purchasing of warehouses (the case of Gulu), in areas that have existing storage facilities,
- c. Working with private warehouse owners to have their facilities licensed as public warehouses (warehouse receipt system). In this case, WFP in collaboration with the Uganda Commodities Exchange (UCE) will support renovation of such facilities as an incentive for the warehouse owners to operate the warehouse receipt system.

In all cases, WFP will install cleaning, drying, bagging and grading equipment. WFP's ultimate goal is to establish a well distributed range of warehouses across the country to provide adequate cleaning, drying, bagging, grading and storage services to small holder farmers and small-medium scale traders so they can get more income from the sale of quality food.

The major constraint identified during the first year of implementation is the absence of storage facilities in some areas deemed in dire need of such facilities. WFP's view is that renovation of existing structures as a support to the private sector to take a lead in the management of the warehouse receipt system is key to establishing a sustainable warehouse receipt system. The absence of existing facilities implies, of course, that new facilities must be constructed. While this is part of WFP's plan, it is usually an expensive option and takes time.

The actual operationalisation of the warehouses including introduction of WRS and subsequent access to credit is another foreseen challenge. Clearly the way forward would be helped by initiating tripartite collaboration involving interested banking institutions, farmers' representatives and WFP. WFP plans to catalyze this process.

Increasing Access to Market Information

To support increased access by smallholder farmers and traders to market information, WFP's P4P has undertaken to publish WFP tender results in newspapers on a weekly basis. These results will give the latest prices offered for the purchase of food commodities. WFP is also discussing with the Grameen Foundation appropriate modalities to implement a mobile-phone based market information system that will capture real time data on a range of variables, including prices. These discussions are at an advanced stage and are expected to bear fruit during 2010².

The major challenge has been that very few farmers can access newspapers. WFP field offices have been asked to disseminate market information to farmer organizations in their respective areas of operation. Preliminary reports indicate that this is beginning to bear fruit.

Training farmers and medium scale traders in improved post-harvest handling, storage practices and marketing.

During the first year of implementation, a total of 4,870 heads of producers' organizations from Busoga and Western regions of Uganda; and Masindi and Kapchorwa districts were trained in improved post harvest handling practices. They were sensitized about the WFP's P4P initiative including the procurement modalities. The main drawback during the process was that not all the members of the producers' organizations were able to attend this very important training/meeting.

Moreover, there are too few WFP staff to be able to reach all the producer organizations. Therefore WFP is planning to enter into partnership with institutions specialized in agricultural training, including NGOs, in all the selected areas, to assist with training in production and post harvest handling. It is clear that more detailed and comprehensive types of training are required in order to change attitudes and lead to the eventual adoption of new technologies.

² **Editors' Note:** FOODNET may also have a role to play in this initiative.

Providing “appropriate technology” Farming Equipment and Inputs; Development of Effective and Sustainable Agro-input Stockist systems

During the first year of implementation, progress on these two activities entailed opening discussions with the Uganda National Agro-Input Dealers' Association (UNADA) to support the strengthening of supply of post-harvest technology and associated equipment. These discussions will eventually conclude with an MoU between UNADA and WFP. From WFP's point of view the initiative will strengthen the capacity to improve post-harvest operations in Uganda, with the desired result being the enhanced quality and value of farm outputs.

Innovative Procurement Systems, including Forward Contract and Direct Purchases

In 2009 direct purchases from farmers constituted almost 50 percent of total acquisition and the warehouse receipt system was involved in about 30 percent of the total purchases from farmers' organizations. P4P puts priority at strengthening the warehouse receipt system and intends to demonstrate this by making purchases through contracts involving WRS a priority.

WFP was not able to implement a forward contract module in the year 2009. However, plans are under way to use this method of procurement in the upcoming agricultural marketing season of 2009/2010. A consultant has been engaged to work out the details and the report is at the final stage.

Expansion of the Warehouse Receipt System, in Collaboration with the Uganda Commodities Exchange (UCE)

A lot of progress has been achieved in this area during the first year of implementation. WFP signed an agreement with the Uganda Commodities Exchange (UCE) in which it committed to support the expansion of the WRS by buying food through it and also expanding the WRS capacity by constructing or rehabilitating warehouses in surplus maize production areas. To date, there are three warehouses, each with a capacity of 1800 MT, that have been licensed under UCE namely; Jinja (Agroways), Masindi and Kasese (Nyakatonzi). WFP's target is to eventually have nine warehouses licensed and operational.

Four additional facilities have been identified namely, Gulu (6,000 MT), Tororo (15,000 MT), another one in Kasese with a capacity of 6,000 MT and one in Soroti with a capacity of 1,000 – 1,500 MT. The WFP Country Office envisages having these facilities operational by June 2010, ultimately increasing the WRS capacity by 28,500 MT from the current 5,400 MT. Gulu and Tororo facilities will be managed by WFP while the other two will be managed by the private sector (warehouse owners).

Increasing access by Smallholder Farmers to Agricultural Financing

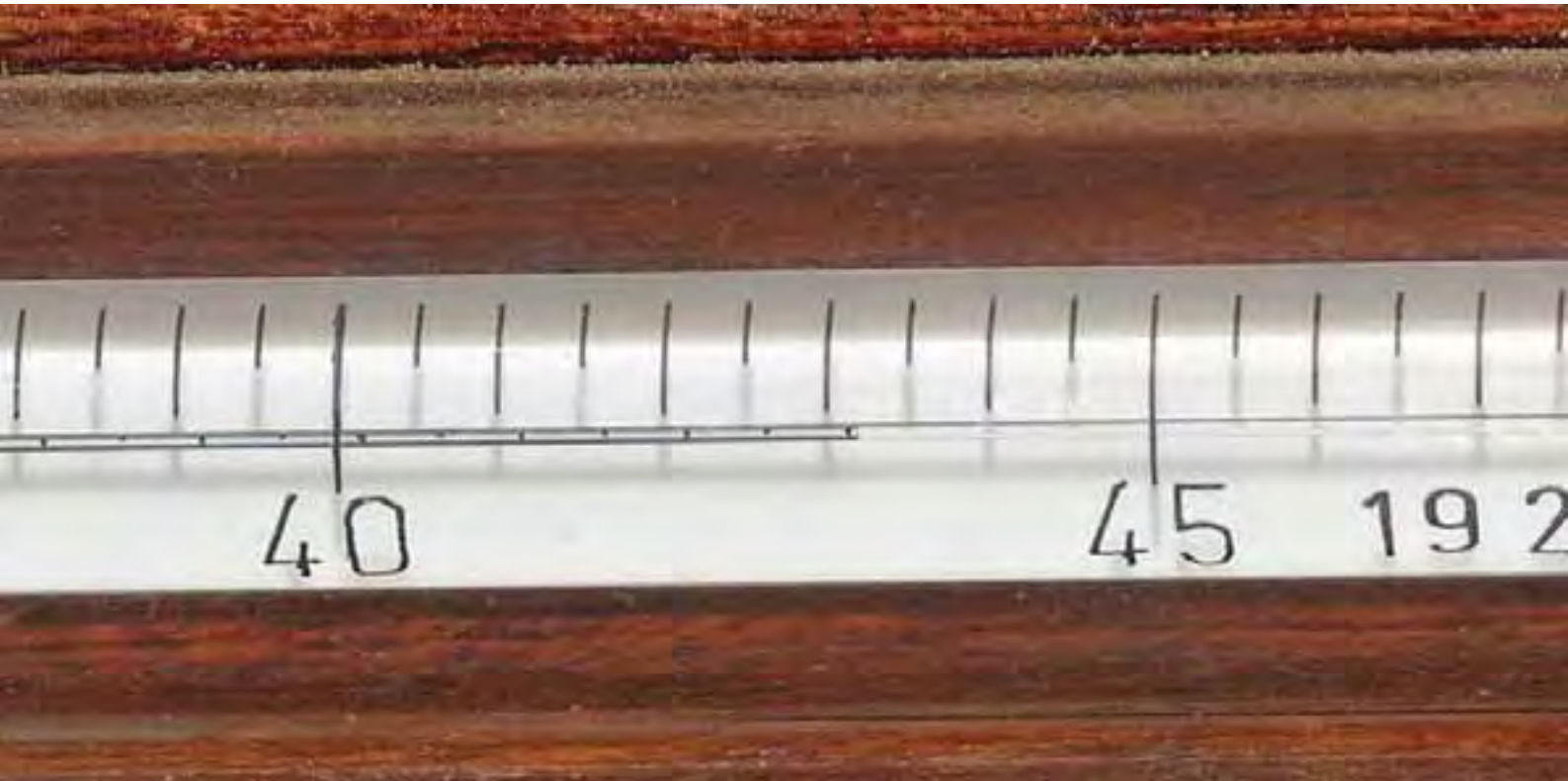
During the first year of implementation, WFP has participated in a number of UCE-initiated discussions with various financial institutions. Some financial institutions including Stanbic Bank, Centenary Bank and Equity Bank have expressed interest in partnering with UCE and WFP to offer financial support to smallholder farmers, farmers' organizations and traders.

However, so far no formal agreement has been reached with any of the institutions noted above. Suffice it to mention that UCE has succeeded in signing agreements with Housing Finance Bank to start financing secured by warehouse receipts. Centenary and Stanbic Banks are expected to follow in due course.

As noted above, the P4P initiative has made good progress in a challenging and fast-changing environment. Now that MAAIF's Development Strategy and Investment Plan (DSIP) has been concluded, the agricultural policy environment is much clearer and P4P is likely to attract more policy interest and more partners.

The P4P naturally complements similar initiatives by the Government of Uganda (GoU) and other development partners to enable increased access to agricultural markets by smallholder farmers. The field is wide and challenges abound, underscoring the need for increased and sustained innovation.

6.2 Management of Risk in Ugandan Agriculture: Possible Insurance Applications ¹



Agricultural risk is the exposure of agricultural production to harmful events, which lead to losses in agricultural production.

Some of the risks affecting agricultural production in Uganda include drought, floods, mud slides, hail, excessive rain, fluctuating market prices, fire, burglary, pests and diseases. According to Hurine *et al*, (2000) and Hardaker *et al*, (2004), agricultural risks can be classified into two major groups, business risk and financial risk. Business risk includes institutional and personal risks as well as risks in production and marketing. Financial risk involves the risks related to the different methods used to finance agricultural production. For example, the farmer should be able to pay bills and sustain agricultural production without going bankrupt.

Baquest *et al*, (1997) and Musser and Patrick (2001) further classified agricultural risk into smaller groups as below:

Production risk includes unpredictable weather, pests, diseases, fire and technological change.

Market/Price risk involves uncertainty of the output and input prices, and their relationship to quality and safety, as well as market access.

Institutional risk includes the government actions, rules and policies in agricultural production, such as tax provisions and payments, food safety and environmental regulations, for example in the use of pesticides and vaccinations.

Personal/Human resource risk involves the effect of illness and death of the farmer's family members and employees on labour and management efficiency.

In some instances, the risk groups can influence each other, whereby a production risk such as bad weather affects farm operations, degrading the quality and quantity of the output, which then has an effect on the market/price risk (Moschini and Henessy, 2001). Farmers are affected by risk on the scale of influence, whereby micro-risk affects the individual farmer only, meso-risk affects the farmer's community and macro-risk the whole region or country.

For agricultural production to be prolific, agricultural risks must be controlled to levels that minimise losses from perils. This process is known as **agricultural risk management** and involves the farmer carrying out risk-averse activities. Such activities include education and training of farmers in better agricultural management practices,

¹ **Authors:** Josephine M Mukiibi and Edgar Muzahura, MicroEnsure

such as application of pesticides and herbicides, growing improved crop varieties and hybrids, climate forecasting and monitoring, particularly for crop production, irrigation of crops and pasture, zero grazing (where applicable), fencing, and greenhouses. These activities can be further complemented with agricultural insurance.

Agricultural insurance is cover against losses in agricultural production due to perils that are usually in the nature of natural disasters. Sometimes there is also an element of revenue assurance built into an agricultural insurance product, to protect the farmer against losses due to a decline in the prices of agricultural products².

Currently, there are two bases for loss assessment in agricultural insurance, namely, **traditional insurance** and **weather index-based insurance**. This article will focus on the latter and its usefulness in agricultural risk management. Traditional insurance offers cover for a number of perils including certain weather risks such as hail, excessive rainfall and drought. This involves costly and time consuming loss assessment visits to individual farms to evaluate levels of weather damage so as to determine amount of payouts. By contrast, weather index insurance bases its payouts on an objective measurable weather parameter (index) linked to agricultural loss rather than the actual loss (Roberts 2005; Bryla and Syroka, 2007; Hellmuth *et al*, 2009; Hill and Torero, 2009).

Weather Risks

Weather is an uncontrollable factor that plays a major role in agricultural production. Crops and livestock are constantly affected by extreme weather events, such as drought, excessive rainfall, floods, hailstorms, windstorms, and frost. These weather risks lead to other risks such as deteriorating soil conditions due to depletion of soil nutrients or soil erosion during drought or excessive rains, respectively as well as poor water quality and limited, irregular water supply. In insurance terms these risks are classified as productive or natural resource risks (Roberts, 2005).

Nowadays, in Uganda, unusual weather is a common phenomenon, and is currently known as climate change. Recent experience includes the following:

- a) Rains are erratic and poorly distributed, frequently accompanied by high wind speeds, hailstorms and flooding.

- b) There is a higher frequency of fluctuating temperatures and longer drought spells.

- c) The onset and duration of rainy seasons is shifting, affecting the timely production of crops, causing losses at pre and post harvest and in extreme cases leading to crop failure.

- d) In livestock production, pest and disease outbreaks are common, are as unpredictable as the weather and lead to higher livestock mortality. For example, excessive rainfall conditions are favourable for some insect vectors that carry and spread diseases, while drought conditions deplete pasture and water resources causing hunger and thirst, leading to higher livestock mortality.

- e) Food security and agricultural production are threatened by the after-effects of weather risks.

In Uganda, like most developing countries in Africa, farmers practise rain-fed agriculture, increasing their vulnerability to weather risk. For instance, in 2007 and 2009, Uganda experienced *El-Niño*, which is associated with uncertain but heavy rainfall. Agricultural production was severely affected in the farming communities of Eastern and Western Uganda. Heavy rains in the latter half of the years in question led to flooding, soil erosion and higher incidence of mudslides. Crops were destroyed and food reserves were lost due to moulds and diseases, because of excessive moisture and water logging.

In these same years, before the onset of *El-Niño*, prolonged drought and continuous heat in the first half of the years in question led to more than 50 percent decrease in crop yields, and virtual failure of crops such as cassava, beans, maize, coffee and tea, leading to food shortages and even famine. The bi-modal rainfall pattern common to Uganda is changing and is no longer reliable for crop production. The first rainy season is short with erratic rainfall and the second season is longer with heavier rains. Still, most Ugandan farmers continue to plant crops in the hope of rains and often risk losing all their production investment.

The longer drought periods experienced in recent years also affect livestock farmers, especially in terms of milk quantity and quality. Feed shortage is coupled with more effort and energy being spent in the search for green pastures and water. When the heavy rains come, diseases and pests increase, leading to higher mortality rates.

² **Editors' Note:** Crop revenue insurance can work both ways. A widespread, adverse weather event can lead to crop shortages and a rise in market price, thus reducing an insurer's liability when weather and price risk are combined in a revenue assurance product. This type of agricultural insurance is highly popular in the United States.

The greater incidence of unpredictable weather is making Ugandan agriculture even more risky as an economic activity. Farmers are reluctant to invest in agriculture, and are deterred further by the limited credit facilities available to them. Lending institutions report weather risk as the highest cause of loan default and therefore charge high interest rates for agricultural loans. Both farmers and agricultural lending institutions would like to see weather risks insured in order to increase the attractiveness of lending for farm production investments.

Weather Index Insurance (WII) for Agriculture

WII is insurance against specific weather perils, especially those involving too much or too little rainfall. Other perils suitable for WII include: adverse temperature, excessive humidity and high wind speeds. These hazards are defined using appropriate indices. Values of these are recorded at district levels from local weather stations or, where possible (e.g. precipitation) by remote satellites. Payouts depend not on the actual individual losses but on the regional recorded index of loss. The insured farmers in the same region pay the same amount of premiums per unit of insurance cover, and receive the same amount of payouts. Payouts are automatic, reducing administration costs and avoiding adverse selection and moral hazard problems (Roberts 2005; Roberts, 2007; Hellmuth *et al*, 2009; Hill and Torero, 2009).

In developing countries, agriculture is characterised by large numbers of small-scale farmers. This makes traditional insurance too costly, because of the high administration costs involved in dealing with large numbers of small transactions. This means that WII in the developing world is generally a better insurance alternative than traditional insurance, because it can provide insurance products to large numbers of small holder farmers, at affordable prices.

1. WII for crops

The most common WII index for crops in developing countries is rainfall cover against drought or excessive rainfall. For example, a healthy maize crop will require a certain range of volume of rainfall, within a certain distribution, in order to stay healthy and be fully productive during its growing cycle. Thus, if it receives less or more rainfall than the optimum its production potential will be reduced and the farmer will suffer a loss. With WII, the crop

will be insured for the duration of the growing season. Rainfall data will be monitored daily by the meteorological authorities and the information regularly distributed to all involved stakeholders, namely the insurance company, lending institutions and the insured farmers.

At the end of the growing season, depending on the weather data, the farmer may be entitled to compensation (insurance payout or indemnity). The insurance payout is calculated using a formula that is specified in the insurance contract. This formula takes into account the crop physiology and expected growth pattern, production costs, the correlation between the crop and the index, the historical frequency of risk and the probability of re-occurrence as well as the transaction costs. Premiums are also calculated from this formula.

The more the actual index deviates from the optimal rainfall range and distribution, the more the payout will be. There is a certain minimum/maximum index limit beyond which total compensation is payable. Payment of indemnities is automatic. The farmer does not have to fill out a claim form nor does the insurance company have to visit the farmers' fields to assess actual loss.

2. Livestock insurance

Livestock insurance in most developing countries is usually confined to mortality cover rather than being concerned with production, yield or performance (Roberts, 2007). Livestock mortality insurance is a form of term life insurance that provides mortality cover against death from any cause. The insured animal must be healthy on the effective date of the policy, and often a veterinarian's health certificate confirming good health is a basic requirement.

Although there has been a high demand for traditional livestock insurance over the last two decades, it is still expensive for the average low income farmer in the developing world. A cheap alternative insurance is the WII for livestock that is more affordable due to low administration costs and coverage of wider regions at the same premium rates. In the developing world, only three WII pilots have been attempted, namely in Mongolia, Burkina Faso and Kenya.

In Mongolia, a three year pilot was started in 2006, for index-based livestock insurance against catastrophic livestock mortality events, in three provinces. In Burkina Faso preparation was started, but the product did not roll out because of the

limited number of large scale farmers. In Kenya, the pilot is underway and it is hoped to offer WII for livestock widely within the country. For example, for a premium of US\$10, a farmer in Marsabit can insure a cow. It dies, then an indemnity payment of US\$200 is made.

In Uganda, WII has not yet been developed for livestock, although there is a high demand for it. WII cover against mortality in drought is a likely area to pilot WII for livestock in Uganda, with a likely entry point being a link to other financial transactions, such as bank loans for oxen acquisition. Other areas that WII may be able to insure, as experience is gained, are losses due to pests and diseases that arise from deviations from 'normal' ranges of rainfall, temperature and humidity.

Typically the sum payable on death of the animal is either the sum insured or the market value, whichever is the lesser amount.

3. WII in Africa and the World

Although WII is a relatively new concept, it has been under development for some time, and has been operational for at least six years. Varying partnerships of governments, academics, and insurance companies have been working on creating insurance packages that are comprehensible and attractive to crop and livestock farmers.

The first pilot was in 2003 in India, with 350 farmers. This has now (2009) scaled up to 1.25 million farmers. The first pilot in Africa was launched in Malawi in 2005 with 892 groundnut farmers. WII was part of a loan package with Opportunity International Bank of Malawi (OIBM) and Malawi Rural Finance Corporation (MRFC) and was implemented by MicroEnsure. The loans were to purchase high yielding inputs such as certified groundnut seed and fertilizer, and insurance payouts were to be paid directly to the lending institutions. As a result of the use of improved inputs, farmers had a bumper harvest with increased yields of up to 200 percent. They were thus able to buy more inputs, new assets and improved farm equipment.

With the success of the pilot, the World Bank donated six new automatic weather stations and provided funds for the upgrade of 43 rain gauges in weather stations. The pilot was able to roll out to more farmers of different crops, such as maize and tobacco.

WII has been tried in other African countries: MicroEnsure launched pilots in Rwanda and Tanzania in 2009. Some 500 tomato farmers in Rwanda and 339 maize farmers in Tanzania were insured against drought and excessive rainfall, using rainfall as the index. In Kenya, UAP Insurance Kenya Ltd collaborated with Syngenta Foundation, Safaricom, and the Kenyan government in a pilot WII in 2009 for 200 maize farmers in Laikipia district, where drought occurred and the insured farmers were compensated for 80 percent of their loss. The pilot has now rolled out to 5,000 farmers in western and central Kenya, again for drought cover.

Ethiopia also had two WII pilots in 2009, carried out in eastern and northern Ethiopia for 139 farmers growing beans and teff, and 200 teff farmers, respectively. Nyala Insurance SC in collaboration with the World Bank, Oxfam-America and World Food Program, provided cover against drought, using rainfall as the index.

WII for livestock was piloted in Kenya and Burkina Faso, using Normalized Difference Vegetation Index (NDVI) and rainfall monitored with satellite technology respectively as the indices. In Burkina Faso it did not roll out because of the limited number of large scale farmers. In Kenya, the pilot is underway (2009-2010) in Marsabit, the driest part of the district, involving collaboration between UAP Insurance, Equity Bank and the Kenyan government.

The longer term intention is to offer WII for livestock to herders from any part of Kenya. As noted above, for US\$10 per annum a farmer in Marsabit, can insure the life of one cow, and will receive an indemnity payment of US\$200 in the event of a successful claim following death of the animal. In a humanitarian gesture, when drought occurred for those herders with uninsured cattle, at the peak of drought, the government offered to buy weakened animals from farmers for slaughter at the Athi-River-based Kenya Meat Commission (KMC) plant³.

WII for Agriculture in Uganda

Uganda's economy is increasingly focusing on the modernisation of agriculture. Investment is a necessary part of this, hence the interest in facilitating microfinance institutions (MFIs) and banks to lend to the agricultural sector.

³ **Editors' Note:** No matter how commendable as a humanitarian gesture, actions like this tend to weaken demand for contractual risk management provided by formal insurance. They also open the doors to political interference, with better-connected politicians usually being more successful than others in obtaining compensatory arrangements for their constituents.

However, unpredictable extreme weather events that cause heavy losses in agricultural production are hindering the process. MFIs and banks would like agricultural insurance products that cover the risks of devastating weather events, so as to be able to offer agricultural loans at more affordable interest rates for a larger number of low income farmers.

The insurance industry's regulating body, the Uganda Insurance Commission, is in support of such developments, but insurance companies are still reluctant to offer traditional agricultural insurance because it is a costly venture. Costs arise both from the risk profile of agriculture, and from the fact that the products require time consuming and costly development actions.

In Uganda, a feasibility study on WII for crops was conducted by MicroEnsure and ILO in 2009 and it was discovered that that demand from the farmers and lending institutions was high, particularly in the eastern, northern and western regions of the country. WII is needed for mainly cereal crops such as maize, rice, wheat and barley as well as tea, coffee and vegetables.

Unfortunately, the pilot scheduled for launch in the first growing season of 2010, did not take off mainly because of the weak infrastructure of the meteorology department. There are not enough fully functioning weather stations to provide adequate cover to the majority of the farming community; moreover the historical data series has gaps. The nearer the farmer is to a weather station that is providing the index, the more the index will reflect the actual loss. A twenty kilometre radius is the ideal, but this varies from region to region, depending on the ecological zones and the local topography.

Furthermore, the premium rates at 5-10 percent of the input production costs or loan are still unaffordable for the average small holder farmer.

Currently, Lion Assurance Ltd is developing traditional agricultural insurance products. With the benefits of WII products, more insurance providers such as MicroEnsure are expected to start offering insurance products in the market.

The quality of weather data is important in designing and pricing of WII products. Ideally, 30 years of historical data is required and the time series should have minimum missing data so that the indices constructed are as accurate as possible. Each index must reflect actual losses as closely as possible, or else farmers will not be properly compensated. The meteorological authorities should increase the number of weather stations in the country as well as attempt to fill the gaps in the historical data. Relief agencies, such as the World Food Program, have installed weather stations in some areas and are interested in funding WII research.

The complexity of WII products sometimes makes it hard for all the stakeholders, including the farmers, to understand and trust the WII product, leading to low uptake. Simpler products with fewer exclusions could perhaps be developed for easy marketing and selling. For example, MicroEnsure is implementing a WII drought product in India that uses the number of days without rainfall as the index, instead of the water requirement for different stages of the particular crop. As a general rule, WII products need to reflect local risks, which vary greatly from one area to another.

Furthermore, the premium rate of 5-10% per insured value still looks expensive for the average farmer. Clearly attention to cost-cutting is vital, while openness and a good information system, coupled to clear and quick indemnity payouts, are necessary to build trust and awareness.

A good example is the Kilimo Salami WII product (UAP Insurance) mentioned above, that is offered to Kenyan farmers who buy fertilizer from two agribusinesses, MEA Fertilizers and Syngenta, East Africa. Registration, confirmation and payouts on policies, in addition to distribution of weather data, are carried out using the scanning, texting and mobile-money services of the mobile telecom network of Safaricom. This use of cellphone technology brings significant cost savings, coupled to greater speed of action.

Lastly, with the continued support of government, trust and awareness will increase and with it larger numbers of farmers will be insured. The major proviso is that suitable products can be designed in order to provide real risk management options at a cost that is perceived by farmers to be reasonable, given the risk management benefits conveyed by insurance.

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List of Abbreviations and Acronyms

AAC	African Agricultural Capital Ltd
ACE	Area-based cooperative enterprise
ADB	African Development Bank
AEW	Agricultural Extension Worker
AFAP	Agricultural Finance Action Plan
AFS	Agricultural finance services
AMFIU	Association of Microfinance Institutions of Uganda
APEP	Agricultural Productivity Enhancement Programme (former USAID project)
ASPS II	Agricultural Sector Programme Support (former Danida project)
BoU	Bank of Uganda
CBO	Community-based organization
CDO	Cotton Development Organization
CFC	Common Fund for Commodities
CGAP	Consultative Group to Assist the Poor
CICS	Competitiveness and Investment Climate Strategy
COREC	Coffee Research Centre
CORI	Coffee Research Institute
CPC	Cane production contract
CSO	Civil society organization
CWD	Coffee Wilt Disease
Danida	Danish International Development Agency
DED	German Development Service
dfcu	Development Finance Corporation of Uganda
DFID	Department of International Development (UK)
DP	Development partner
DRC	Domestic resource cost
DSIP	Development Strategy and Investment Programme - MAAIF
EAC	East African Community
EADB	East African Development Bank
FAO	Food and Agriculture Organization of the United Nations
FAQ	Fair average quality – coffee
FI	Financial institution
FINCA	Foundation for Community Assistance (MDI)
FoB	Free on board (FoB/R is: free on board rail)
FSD	Financial System Development Programme (BoU/GTZ)
FSDU	Financial Sector Deepening Uganda (former DFID project)
GAPS	Good agricultural practices
GDP	Gross Domestic Product
GoU	Government of Uganda
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (German Technical Cooperation)
HSE	Helsinki School of Economics
IAP	Index of agricultural production
IDEA	Investment in Developing Export Agriculture (former USAID Project)
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization (a UN specialized agency)
IT	Information technology
KACOFA	Kapchorwa Commercial Farmers Association
KCA	Kaweri Coffee Alliance
KCFASP	Kaweri Coffee Farmers' Alliance Support Project
KSL	Kinyara Sugar Ltd
KYAPS	Kyamuhunga Peoples Savings and Credit Cooperative Society

LC	Letter of credit
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MBWin	FAO/GTZ Microbanking System (MIS)
MCAP	Matching Grant Facility for Capacity Building
MDI	Microfinance Deposit-Taking Institution
MF	Microfinance
MFI	Microfinance Institution
MFPED	
(Also MoFPED)	Ministry of Finance, Planning and Economic Development
MFW4A	Making Finance Work for Africa Initiative
MIS	Management Information System
MNPSC	Mid-North Private Sector Development Co. Ltd
MoFPED	Ministry of Finance, Planning and Economic Development
MOP	Microfinance Outreach Plan
MoU	Memorandum of Understanding
MSC	
(Also MSCL)	Microfinance Support Centre Ltd
MSME	Micro, small and medium enterprises (see also SME)
MT	Metric tonne
MTCS	Medium Term Competitiveness Strategy
MTTI	Ministry of Tourism, Trade and Industry
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organization
NDA	National Drugs Authority
NDP	National Development Plan
NGO	Non-governmental organization
NKG	Neumann Kaffee Group
NRM	National Resistance Movement (the ruling party in Uganda)
NUCAFE	National Union of Coffee Agribusinesses and Farm Enterprises. (founded in 1995 as the Uganda Coffee Farmers Association (UCFA).
OPV	Open-pollinated variety – of seed
P4P	Purchase for Progress – WFP scheme
PAR	Portfolio at Risk
PEAP	Poverty Eradication Action Plan
PFA	Prosperity for All Programme (formerly known as Bonna Baggagawale)
PMA	Plan for the Modernization of Agriculture
PMS	Performance Monitoring System
PMT	Performance Monitoring Tool
PO	Partner organization (MSCL terminology)
PRDP	Peace, Recovery and Development Plan – for Northern Uganda
PRSP	Poverty Reduction Strategy Paper – World Bank
RMSP	Rural Microfinance Support Project (ADB/GoU)
RWH	Rain water harvesting
SACCO	Savings and Credit Cooperative
SG 2000	Sasakawa Global 2000
SHG	Self-help group
Sida	Swedish International Development Co-operation Agency
SME	Small / medium enterprise
UCA	Uganda Cooperative Alliance
UCB	Uganda Commercial Bank (now defunct)
UCDA	Uganda Coffee Development Authority
UCE	Uganda Commodity Exchange

UCFA	See NUCAFE
UCGEA	Uganda Cotton Ginners and Exporters Association
UCOP	Unit cost of production
UCSCU	Uganda Cooperative Savings and Credit Union
UCTF	Uganda Coffee Trade Federation
UGX	Uganda Shillings (also UShs)
UIB	Uganda Institute of Bankers
UML	Uganda Microfinance Ltd. now Equity Bank
UMU	Uganda Martyrs' University
UN	United Nations
UNADA	Uganda National Agro-input Dealers Association
UNCTAD	United Nations Conference on Trade and Development
UNEX	Union Export Services Ltd. - coffee export organization for coops
URA	Uganda Revenue Authority
URM	Upland Rice Millers Ltd
USAID	United States Agency for International Development
USD	United States Dollar – also US\$
VAT	Value Added Tax
WFP	World Food Programme
WII	Weather Index Insurance
WRS	Warehouse Receipt System



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